

# THE IRON AGE

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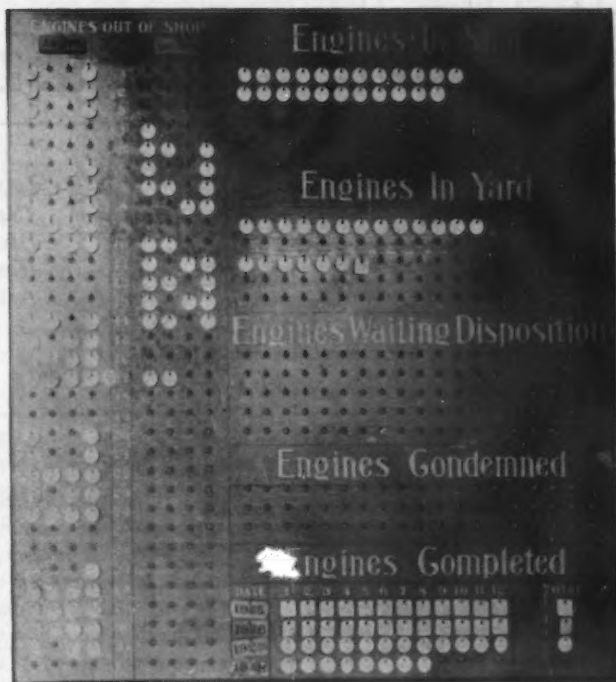
## Repairing Locomotives on Schedule

How the "Spot" System of Operation Is Applied  
at Readville—Definite Program  
and Control Employed

**A**DVANCING of units in process of assembly in such manner that their speed of movement serves to maintain a proper supply of work waiting at each operating station has long been standard practice in many plants. But the application of this system, or one patterned upon it, to repairing of such complex organisms as locomotives has not made the same measure of progress. This is largely because of the wide dissimilarity between the work required to be done upon one locomotive and that which the next one demands. For this reason the methods now in vogue at the railroad shops at Readville, Mass., will prove of special interest.

Many schemes have been evolved to reduce the average number of shop hours per locomotive necessary to complete the work of general overhauling upon this important unit of railroad machinery. Among the latest of them is the "spot" system recently adopted by several large roads. This system contemplates establishment of a schedule, covering a stated period in advance, to list the individual engines to be overhauled, show the dates upon which they are to be delivered to the shop by the transportation department, indicate the nature and extent of the work to be done upon them and the approximate number of hours which will be required to complete it, and to allot to each engine a definite space in the yard and shop where it may be found upon any given date as the work progresses.

To carry out successfully the details of the system close cooperation among the heads of all mechanical subdivisions is essential. To secure this cooperation meetings of these



*Visual Record in Superintendent's Office, Showing Each Day Where Each Locomotive Under Repair Is and Permitting Estimates as to Date of Completion*

officials are arranged at stated intervals—usually once a month—at which meetings the future known requirements of each subdivision in the way of locomotive repair are discussed, the nature and approximate amount of work to be done upon each engine is decided upon and the order of precedence is determined. From the data thus provided the advance schedule is prepared.

### Work Apportioned Months Ahead

Advance schedules prepared and approved at each monthly meeting of the mechanical executives cover five months; one month being stricken from the list (assuming that all work for the period is completed) and a new month added. At the same time, any minor changes which may be made necessary by the exigencies of

ed service are noted in the duplicated four-months and the schedule is corrected for the entire period.

The locomotive shop is operated 16 hr. daily, with two gangs, the second shift force being much smaller than the first, thus providing sufficient flexibility to smooth out any irregularities that may occur by reason of emergency jobs or of repairs which may require more than the estimated time to complete, and to maintain an even rate of production according to schedule. At the same time, the knowledge that every engine is scheduled for delivery on a certain date is an incentive to the men to get their parts of the work done within the allotted time.

Survey of the advance schedule, a copy of which is in the hands of all executives responsible for production, shows not only the serial numbers of the engines to be

overhauled during the ensuing five months, and the date of delivery, but indicates what new parts, if any, are to be provided, as well as the time and place where they must be delivered to meet the specific engine at a given location as it progresses through the shop.

Elaboration of the schedule in the form of a work sheet is made up daily and delivered each morning to all foremen, so that every one may know just what repairs and replacements must be delivered to specific locations throughout the shop at specified times.

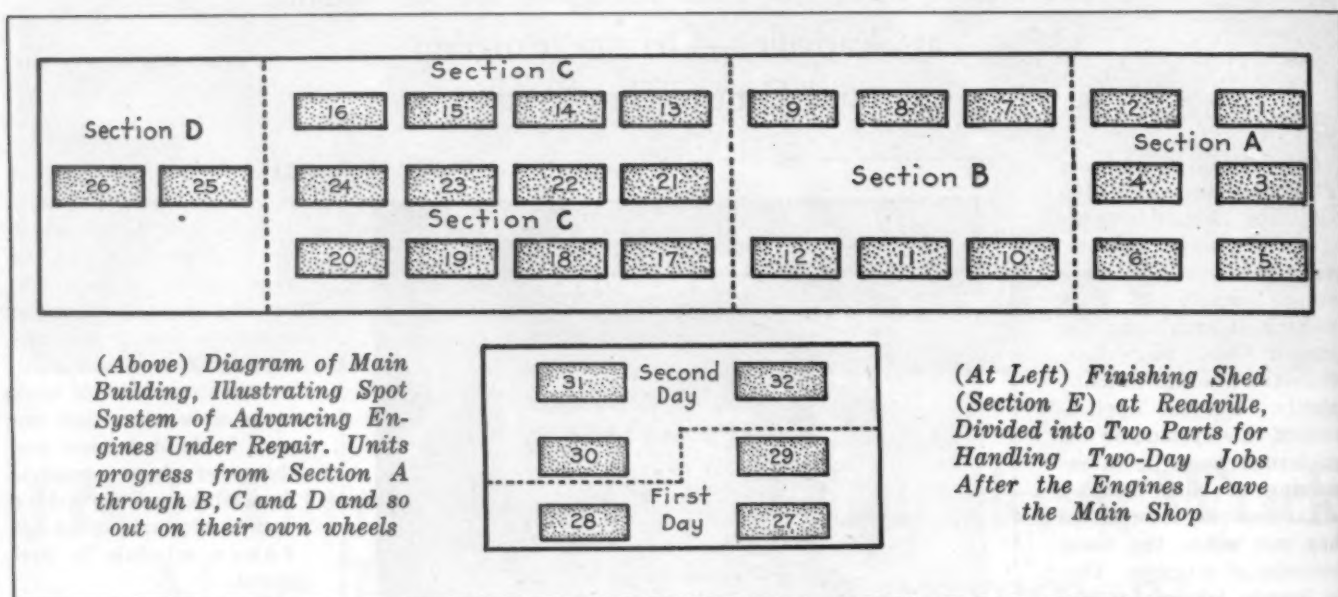
Numbered distribution tracks in the yard receive the locomotives, as they are delivered from the various subdivisions of the road, in their order of precedence. Engines are immediately dumped, boilers drained, tenders detached and dummy couplers applied to the rear drawbar pockets, so that the locomotives may be coupled at either end to a switching engine for transference. The tenders are placed upon the coal track, where the coal and water remaining in

may have been disclosed by the removal of dirt and grease in the sand-blasting operation.

#### Method of Progression Used

Application of the spot system in the locomotive shop may be seen in Fig. 1, which is a partial diagram of the floor in that part of the building usually called the "erecting" shop; in this case shorn of its regular designation by the fact that the assembly, or "erection," is progressive, and the engine remains in one place for but a limited time. Engines enter from the right.

The space in this part of the shop is divided into four sections, lettered A, B, C and D respectively, but separated only by painted posts and lines. Section A is devoted to heavy repairs, including frames, cylinder replacements and major boiler repairs. In this section are six "spots," or positions, numbered 1 to 6, inclusive, to which engines are delivered, minus their wheels, from the adjacent unwheel-



them may be taken out, and they are then headed in upon a track leading to the tender repair shop.

Upon the day scheduled for work to begin, usually the day of receipt or the day following—the selected engine is set off upon a track leading to the stripping sheds. Here it is carefully gone over by inspectors, who mark it with chalked hieroglyphics, intelligible to railroad men, according to the nature and extent of the repairs to be made. It is then moved forward to the stripping sheds to be dismantled.

By having the work of stripping done in a separate building, adjacent to the cleaning house, much of the dirt and grease incident to a long period of road service is kept out of the locomotive shop and one of the disagreeable features of locomotive repair thereby eliminated. Work in the stripping sheds includes the removal of such boiler and firebox parts as are known to need renewal, but does not involve unwheeling.

The stripped parts are conveyed in baskets or individually, according to their size and weight, to the potash vats in the nearby cleaning house, and from thence distributed—clean and free from grease—to the several repair departments of the locomotive shop. The engine itself goes forward upon its own wheels, still on the same track to another building wherein the cylinders, all remaining running gear, the smoke arch and the interior of the boiler are cleaned by sand-blasting. Upon issuing from the sand-blast house the engine is again inspected for possible defects that

ing pits. Here they remain from three to eight days, in accordance with the amount of work to be done upon them. There are no tracks in sections A, B or C, the engines being moved when necessary by the overhead cranes.

Section B also provides six positions, arranged somewhat differently to allow more working space around the engines, and numbered 7 to 12, inclusive. Here are conducted some of the lighter operations upon boilers, frames and cylinders. Engines may remain in this section from three to six days. When the work upon any engine in section A or section B has advanced to a point from which it can be completed in four days, it is advanced to spot 13 or 17 in section C for the remainder of the work.

In section C, unlike sections A and B, the engines are moved forward from one position to the next each calendar day. As there are in this section two lines of four positions each, upon which two engines are undergoing the same stage of repair coincidentally, this means that no given engine may remain in the section for a longer period than four days, and that two engines are transferred to section D every day. All moves are made at the beginning of the night shift, by a gang of men specially trained to this job.

Section C is supplied with engines from section A or section B, the work upon which has advanced to within four days of completion; or direct from the unwheeling pits, with engines which require not longer than four days to make the entire repair.

The first move each night is to run two engines from



spots 25 and 26, section *D*—now upon their own wheels—cut into the yard to be taken to the finishing shed. The switching engine handles this job. Engines upon spots 23 and 24 are advanced to the vacated places and those upon spots 21 and 22 are moved forward correspondingly. This move leaves spots 21 and 22 uncovered, and upon them is immediately assembled the running gear of the engines occupying spots 16 and 20 of section *C*.

Engines upon spots 16 and 20 are now lifted by the cranes and deposited upon their wheels on spots 21 and 22; those upon spots 15 and 19 are advanced to 16 and 20, respectively, and all other engines in section *C* are moved forward correspondingly to leave spots 13 and 17 uncovered for the reception of engines from the preceding sections or from the unwheeling pits, as previously noted.

#### Engines Unwheeled Before Entering

Two unwheeling pits are located immediately to the right of section *A*, at the entering end of the shop. To them two engines are delivered each day from the track leading from the sand-blast house. A gang of men starts at once upon the work of preparing them to be lifted from their wheels, so that, by the time the moves within the several sections have been made, these two engines are ready to be deposited in the finally vacated positions, which may be in any one of the three sections, according to the nature of the repairs to be made upon the incoming locomotives.

The two engines hauled away from positions 25 and 26, section *D*, are coaled and watered in the yard, after which the switching engine takes them to the finishing shed, Fig. 2, for minor adjustments preparatory to road service. Here they are fired, and for the first time move under their own power. As in the locomotive shop, they advance progressively from one position to another, and in the final position they are spray painted.

An outstanding advantage claimed for the progressive assembly method as applied to locomotive repair is that each part of the work is performed in a definite place. The several parts repair departments of the shop may be located adjacent to the positions where the parts are to be applied to the engine, and thus much long-distance trucking is avoided. Operations requiring steam, air, gas or water can be performed close to the source of supply and the promiscuous distribution of these commodities by long lines of hose, with attendant difficulties when such lines of hose are inadvertently cut, is forestalled.

Portable tools and their accessories are always at hand when needed; never at the other end of a shop a quarter of a mile long. Last, but by no means least, each job is handled by gangs of men who are trained to that job, who are not widely separated, and who have all the appliances necessary to their respective trades ready to their hands.

All newly overhauled engines are given a running test of about two hours' duration over what is called a "slip" track in the yard. The track is about half a mile in length and has a pronounced hump about midway of its length. The rails of the track are well greased, and this condition is maintained by allowing grease to drip from two small tanks secured temporarily to the pilot of the engine under test.

An engine starting from either end of this track is faced with a considerable grade, up which it climbs quite slowly, though the machinery may be running at a rate of 50 or more miles an hour. Passing over the hump, the engine is reversed and the locomotive slides slowly down the descending grade, often with its wheels running at equal speed in reverse direction.

This manner of testing allows the inspectors to ride upon exposed parts, or even to walk beside a locomotive which is running at normal road speed, yet advancing so slowly that they may observe clearly the action of the machinery under the equivalent of actual road conditions.

#### Visual Record in Superintendent's Office

To enable the general superintendent of shops to keep in close touch with the work in progress, the board shown in Fig. 3 is affixed to the wall of his office, in a position where it may readily be observed from his desk. Round tags, each bearing the number of an engine in the shops or yards, are hung upon convenient hooks on the board, to show where each engine may be found.

Rapid progression of the work involves the shifting of these tags from one position to another every day, as the engine itself moves through the shops. As all the moving is done at night, it becomes an easy matter for the official having the work in direct charge to change the tags each morning to correspond with the actual moves already made. The superintendent is thus prepared at a glance to answer any question that may come in from the various divisions of the road as to the progress of work upon any given engine, and the date upon which that engine may be delivered to service.

## Beautifying a Factory Entrance in Illinois

**T**HE entrance to the plant of the Whiting Corporation, Harvey, Ill., was recently awarded the second prize in a contest conducted by the "Illinois Journal of Commerce" to determine the most attractive factory dooryard in the State. The competition was carried on in an effort to arouse interest in better factory surroundings



# Anti-Trust Law Repeal Unnecessary

## Trade Commission, Under Broader Interpretation of Its Powers, Can Help Industries Stamp out Competitive Excesses

BY ABRAM F. MYERS\*

**A** CHARGE frequently hurled at the anti-trust laws is that they make competition a fetish; that competition has been exalted over all considerations of economy and efficiency. These flights are, for the most part, purely rhetorical. The competition that the anti-trust laws would preserve is not the jungle competition that the critics of those laws imagine. The anti-trust laws recognize that not all competition is good, and that unrestrained competition is bad. They have been as often invoked for excesses of competition as for the suppression of competition.

The test of the legality of a corporate combination is not the amount of inter-company competition that is suppressed, but whether the competition it affords is fair or oppressive. And the Federal Trade Commission Act has for its main purpose the prevention of unfair methods of competition in interstate trade and commerce.

### Sees Wider Field of Usefulness for Commission

It is on the proper interpretation of the words "unfair methods of competition" that the ultimate reconciliation of the proper needs and aspirations of business with the law depends. The commission has, and was intended to have, a wider field of usefulness than the mere prosecution of individuals and concerns for the use of unfair competition. Also it is clear that the language of the statute is not to be limited to common law definitions. It is the formula whereunder the commission may and does cooperate with industry, through the trade practice conference procedure, in writing codes of ethics that are bringing about that degree of proper and desirable stabilization compatible with American institutions and ideals. In this way the commission is making good the prediction of the late Senator Cummins in a speech in the Senate on Sept. 7, 1914:

I predict that in the days to come the Federal Trade Commission and its enforcement of the section with regard to unfair competition will be found an anchor for honest business. I believe it will introduce a stability in business that hitherto has been unknown. I believe it will restore confidence among those who are conducting their affairs honestly and uprightly. I believe it will be found to be the most efficient protection to the people of the United States that Congress has ever given the people by way of a regulation of commerce, and that it will rank in future years with the anti-trust law; and I was about to say that it would be found still more efficient in the creation of a code of business ethics and the establishment of the proper sentiments with regard to business morals.

### How Commission Enforces Ethical Codes

A trade practice conference is authorized by the commission on the application of a substantial part of an industry, usually made through their trade association. The industry is thereby enabled to write its own code of ethical and economic practice, subject to approval or rejection by the commission in the public interest.

Resolutions aimed at practices illegal per se are placed

in Group I, and the commission undertakes to enforce compliance therewith by proceeding against all violators, whether they have subscribed thereto or not, under Section 5 of the Trade Commission Act. Resolutions placed in Group II are aimed at practices that have not heretofore been held unlawful by the commission or the courts. The secret violation of such a resolution by one who has openly subscribed thereto, and has led his competitors to believe that he will observe it, will result in a proceeding by the commission on the ground that such secret violation is in and of itself an unfair method of competition.

Thus these codes for the strengthening and uplifting of American industry are made enforceable in every particular save one. The commission has not yet undertaken to enforce resolutions of the character included in Group II against a recalcitrant minority who will not subscribe thereto.

The absence of means for the enforcement of Group II resolutions against non-subscribers has proved a serious stumbling block to the efforts of many industries at self-regulation. Thus the manufacturers of knit underwear at a recent conference declined to adopt resolutions fixing standards for the wool content of "part wool" garments because they could not be assured of protection against the competition of the low-content manufacturers. Thus a grave question is presented as to whether codes of ethics for American business are to be written by a progressive majority, or by a reactionary minority. For it often happens that are calcitrant 15 or even 10 per cent of an industry, seeking and obtaining a competitive advantage by persisting in practices which the majority have proscribed, eventually brings all down to its level, and in this way praiseworthy efforts to elevate the standards of an entire industry may be defeated. In this fashion the minority effectively imposes its will upon the majority.

### Commission Cannot Originate Code

The remedy for this, if any there be, lies in the gradual expansion of the commission's powers under existing law, rather than in new legislation. It is doubtful if the building up of a new code of business practice will lend itself to Congressional definition. Certainly any attempt by Congress to decree by law that the minority in an industry shall conform to the wishes of the majority in respect to practices never heretofore regarded as unlawful would meet with determined opposition and would give rise to grave questions of constitutional right. In any such proposal provision would have to be made for an umpire to guard the minority against oppression and the public against extortion.

The courts at a time when the Federal Trade Commission was regarded as a none-too-constructive agency gave to the words "unfair methods of competition" a somewhat narrow interpretation. They held that the words did not apply to practices not characterized by fraud, deceit, bad faith or oppression, or which did not tend to restraint of trade or monopoly. But this definition was given in cases

\*Federal Trade Commissioner. From address before American Institute of Steel Construction at Biloxi, Miss., Nov. 15.



in which the commission had attempted to apply the law to practices of which it did not approve, without regard to legal precedent and contrary to the customs and usages of trade. The courts put an end to the notion that the commission could evolve out of its inner consciousness a business code with the binding effect of law, and by way of emphasis went further than was necessary to achieve their purpose.

#### Code Should Be Sponsored by Clear Majority of Industry

What of a code of fair trade practices for each industry, written by the overwhelming majority thereof, with the Federal Trade Commission as arbiter? The language of the statute is not like a crystal, fixed and unchangeable; it is applicable and has been applied to many practices not specifically in the minds of the lawmakers when the act was passed. The question is simply one as to the extent to which the customs and needs of the preponderant part of an industry may be taken into account by the commission and the courts in deciding what are, and what are not, unfair methods of competition. No case involving a practice formally condemned by a clear majority of the industry involved has been presented to the courts together with the fact of such condemnation.

Approached from this angle the element of coercion is greatly minimized and the grave constitutional questions largely disappear. It is not a case of galvanizing the will of the majority into law. The needs and customs of the majority are merely taken into account in applying the law now on the statute books. The plan contemplates an administrative and (if sought in individual cases) a judicial weighing of the relative merits and advantages of the proposals of all interests concerned. It further contemplates the rejection of any and all measures that would work undue hardship on any member or branch of the industry in question, or on the public. And it is founded on the conception that the minority has no greater right to impose its will on the majority and on the public, by standing in the way of important reforms in the public interest, than the majority has to impose its will on the minority by insistence on measures that would unduly prejudice the rights of such minority.

#### Outlawing Practices Admittedly Unlawful

On the question whether the experiment is worth making let us consider the possibilities of the procedure as indicated by more than 40 successful trade practice conferences already held. In the beginning the conferences were largely confined to outlawing practices admittedly unlawful. It is not to be inferred, however, that these conferences had no constructive value. They had the effect greatly to elevate the standard of ethics in the industries involved; to protect honest manufacturers and dealers against the unfair competition of their unscrupulous rivals; and to restore and increase public confidence in such industries. Certainly no one can question the benefit to all concerned from the wholesale elimination of such pernicious practices as short weights and measures, false advertising and misbranding.

Believing that the establishing of standards of quality in commodities was the greatest single reform that could be accomplished for the protection of the public, the commission widened the scope of its conferences to include content and quality definitions of furs, "Castile" soap, engraving and embossing, gold-filled watch cases, rayon, furniture, woven furniture, rebuilt typewriters, plate glass and hickory handles. The hickory handle conference is significant in its bearing on the future usefulness of the trade practice conference procedure, in that the standards of quality adopted at the conferences were those which had previously been worked out by representatives of the industry in cooperation with the division of simplified practice of the Department of Commerce. In other words, the subscribers

to the conference rules availed themselves of this means of translating the beneficent results of the helpful cooperation of the Department of Commerce into a binding agreement.

#### Scope of Trade Practice Conferences Broadening

In the past year the conferences have been even more constructive from the standpoint of the industries affected. Resolutions have been adopted providing for the publication of prices realized in actual transactions; condemning price discrimination in the language of Section 2 of the Clayton Act; declaring against the payment or allowance to buyers of commissions, bonuses, rebates or allowances of any kind; against the rendering of unusual services or the assumption of unusual charges without charging the customer therefor; against discrimination in price resulting from the allowance of quantity discounts on split shipments; against selling goods below cost; and against the dumping of considerable quantities of goods in territories outside of the subscriber's particular markets and selling such goods at prices below those prevailing in his own territory.

This brief review of recent accomplishments seems also to me to reflect the current trends of thought in Government and in industry. So far as possible the adjustment of the aspirations and needs of business with the law will be accomplished through conference and cooperation. Competition is to be preserved and the undue concentration of economic power avoided by encouraging and approving that degree of cooperation between independent businesses which will enable them to survive the competitive struggle and remain independent. Waste is to be eliminated and the public protected by the establishment of standards of grade and quality. And the extremes of overproduction and underproduction are to be avoided, and stability of employment promoted, by encouraging the dissemination and intelligent use of the essential facts of industry.

#### Firm Price Policy to Be Encouraged

Care in the pricing of products and the avoidance of secret departures from prices openly established will be favored to the end that industry may not be plunged into price wars to their impoverishment and demoralization. As in the past, the use of approved methods of cost accounting will be urged. The adoption of and adherence to a firm price policy will be encouraged. Such a policy is in keeping with Section 2 of the Clayton Act and is justified on other grounds as well. The products of one industry are the raw materials of another, and discrimination between competing concerns in the matter of prices on necessary materials, not based on differences in quality or quantity, will in the end give rise to the very evils that it is the purpose of the anti-trust laws to prevent.

At this stage we might well inquire what scope would be left to competitive effort under such a policy? What protection is afforded the public, and what becomes of the highly developed professional purchasing agent? I firmly believe that under such a system competition would continue to be the great regulator of our domestic economy. There would be no decrease, but a marked increase, in the steady march of progress. The struggle for greater efficiency, for the elimination of waste and for fixing standards of quality would continue with renewed vigor. Prices would be fixed not in concert, or by agreement, but by each industrial unit acting singly, and they would reflect the relative efficiency and individual policy of each concern. The striving for improvement in the quality of output would be unhampered by the temptation or need to lower standards in an effort to realize a profit in a chaotic market.

#### Rationalization Program Requires No Trust Law Tinkering

Under such a system the professional buyer would find ample opportunity for the legitimate employment of his talents. He could still shop for the lowest prices and the

best quality. But the lying buyer would be effectively stopped, because the price quoted him in each instance would be the best that the bidder could offer, having due regard to the situation in his company and the prosperity of his industry, and would not be shaved to meet supposedly lower prices by competitors which actually existed only in the imagination of the buyer.

With the prospect of such a policy of rationalization under enlightened leadership in industry and an administration committed to cooperation and engineering efficiency, what is to be gained by trust law tinkering at this time? That peculiar conditions in the coal and oil industries call for special attention is admitted. As a member of the committee of nine of the Oil Conservation Board I joined in a recommendation for a modification of the anti-trust laws to meet the peculiar needs of the oil industry, and that recommendation has been indorsed by the American Bar Association. Section 7 of the Clayton Act exists as a nuisance

law in that it is wholly ineffective to prevent mergers and only makes them more troublesome and expensive. But a proposal to repeal that provision might encounter as much sentiment in favor of preventing mergers as in allowing them, and no one can predict what the outcome would be. That there should be some rationalization of the law with respect to the maintenance of resale prices on competitive trade-marked goods is attested by the hopeless confusion into which this subject has been plunged by the conflicting and inconclusive decisions of the courts.

With these exceptions I can see no good end that can be served by the repeal or a general modification of the anti-trust laws. I do not believe that the country will ever abandon free and open competition as the keystone of its economic policy. An enlightened administrative policy will enable us to retain all the benefits of competition and to eliminate all that is bad. That the realization of these ideals is possible is attested by the accomplishments to date.

## Central Welding Shop Leads to Economies

Modest Equipment and Resourceful Workmen Available for Repair, Construction or Production in All Metals

BY T. C. FETHERSTON\*

IT is frequently found that in plants which have had a cutting and welding outfit for a long time no clear idea is had of the maximum usefulness of the oxy-acetylene process. Thus a sheet metal company might purchase equipment to oxweld a particular lot of tanks and fail to realize, when a brake frame cracks, that there is already



*A Good Welding Shop Without Elaborate Equipment. At right is oxy-acetylene equipment on a hand truck; another set is at the welding table in center; on wall is welding rod rack and at left is lime bin for annealing castings. In foreground is a variety of work done on steel, iron and alloys*

on hand a means of speedy and economical repair. Again, a manufacturing plant might buy an outfit solely for repair work, never realizing that the welders could take an important place in direct production. Or a company might use its outfits for both repair and production work without thinking that they could also be used to install pipe lines, or to cut up scrap.

\*Technical Publicity Department, Linde Air Products Co., New York.

Conditions of this sort are not conducive to true economy because all available resources are not being utilized. But, on the other hand, it would seldom pay to employ a man solely to look for places to use the cutting and welding blowpipes. The best procedure is to let new applications come to light naturally.

This is done quite readily by establishing a central welding department or shop. It is not necessary that all oxy-acetylene operations be carried on in a special building, but rather that they be organized and assigned definite headquarters. Then if the machine shop wants a foot treadle repaired there is a place to take it. Or if the men tearing down old equipment want some steel work cut away there is a definite place where they can locate a "cutter" with the necessary equipment.

A central welding shop accomplishes several things: Operators know where to find apparatus; shop foremen know where to go to have cutting and welding jobs done; a shop warrants a welding foreman of more than ordinary ability; and executives have a means of keeping welding costs.

When one considers the number of jobs and diversity of work which can be done by such a department it can readily be appreciated that the shop need never be without work of some kind, even though it is quite modest in size and equipment. If there is no production work, the operators can always reduce the plant's scrap pile either by reclaiming material or by cutting up worthless junk. A well managed central welding shop will prove a real boon to any plant. It can be a self-contained unit, always busy and always assisting in cutting down operating expenses.

Development of the use of steel as a building material for bridges is dealt with in a 20-page booklet just issued by the American Institute of Steel Construction, Inc., 285 Madison Avenue, New York, entitled "Endurance and Beauty in Steel Bridges," by Charles Evan Fowler, consulting engineer. The booklet traces the uses of iron and steel in bridges from the last quarter of the eighteenth century down to the present time and discusses the advantages of the various types of steel spans now being constructed.



# French Industry Active, Wages Low

## High Output Contrasts with Lagging Production and Continued Unemployment in Britain—Buying Power of French Workman Small

BY EDWIN C. ECKEL\*

PARIS, FRANCE, Oct. 25.—It has been necessary to spend the past two months in northern and northwestern France, mostly in mining and manufacturing districts, so that it has been possible to get at least a rough idea as to wages, living costs and other industrial conditions in France at the present time. An incidental stay of a week in England has furnished certain data and impressions that I am using here as convenient contrasts to French conditions. I say "contrasts," because as a matter of fact there are far more points of difference than of agreement in the present industrial and economic status of the two countries. Among the main points on which considerable differences now exist are wage scales, living costs, unemployment, tax and tariff policies, labor views, manufacturing costs and export possibilities. It will be seen that some of these are likely to touch our own interests rather closely.

### French Industrial Output at New Peak

As offering perhaps the best general guide to the present status of French industry, the following official indexes of production, using 1913 as a base of 100, are of interest. From the entire mass of data available I have selected certain critical years and dates, and certain important industries.

Indexes of French Industrial Production, 1919 to 1928

Year	General Aver.	Metal-lurgy	Textiles	Auto-mobiles	Build-ing	Paper	Leather	Rubber
1919	57	29	60	..	16	51	102	305
1920	62	41	66	..	27	65	88	233
1921	55	41	52	..	23	50	75	230
1922	78	61	84	..	37	60	94	359
1923	88	68	83	..	58	80	103	416
1924	108	94	85	..	74	77	110	538
1925	107	101	85	..	80	83	104	502
1926	124	113	94	..	102	90	128	599
1927	109	112	90	..	72	83	103	547
1928 (Jan.)	116	118	100	..	68	75	118	555
1928 (Mar.)	123	125	102	624	79	..	..	538
1928 (Aug.)	128	126	100	670	98	..	..	595

The table brings out very strikingly the two main facts as to the French industrial situation: First, that French industry regained its old levels very slowly, reaching on the average its 1913-1914 productivity not until 10 years later (1923-1924); that it then rose rather rapidly to a new high point in 1926; and after a notable but short relapse in early 1927 has now, in the latter part of 1928, reached an entirely new peak, even higher than its 1926 maximum. Second, that this advance is very irregular as between trades; the automobile and rubber factories show phenomenal gains over pre-war years, while the paper, textile and building trades are either worse off than 15 years ago or not above their 1913-1914 status.

As compared with this great increase in French industrial production we may note that, though the United States shows an even greater gain (155 in 1928 as against a base of 100 in 1913), Great Britain has never been able to regain its pre-war level, the British indexes standing at:

1913.....	100
1925.....	87
1926.....	67
1927.....	96
1928 (Feb.).....	93.4

\*Mining geologist, 1503 Decatur Street, Washington.

The sequel to this is, of course, that there is this year practically no unemployment anywhere in France, while there is a good deal of forced idleness in Great Britain. What struck me most in London, perhaps, was that there were able-bodied men begging on the streets—something that I don't recall having seen in Paris at any time in the last 10 years. Recalling that the British Government is pretty well committed to a permanent policy of pay for the unemployed, it is clear that the economic conditions there are at the moment less favorable than those in France.

For those who are fully employed, English wages are, of course, far higher than French, class for class, though also far lower than American. French wages are, as a matter of fact, pretty miserable, and do not in any case leave a reasonable margin of buying power for the laborer, above his strict necessities. And that fact reacts finally on the profits of the French manufacturer and shop-keeper, for you cannot expect to make much money in selling goods to poorly paid workmen. We all talk prettily at times about the French genius for economy; but there is nothing pleasant about a wage scale that does not permit anything but economy.

So far I have not been able to find any official data on French average wages—except for the coal miners, which I shall discuss later. But in my visits to various mine and mill centers I have put together the results of talks with managers and miners, and the general result is as follows:

The immediate Paris region is a region of relatively high pay for skilled mechanics, owing probably to the boom in motorcar and related industries. A skilled workman in a Paris factory or mill may make 5 to 6 fr. (20 to 24c.) an hour. On the usual 8-hr. Paris day his daily pay may therefore run from \$1.60 to \$1.92. But this is a very exceptional rate of pay for France, and its occurrence in a few favored industries in the Paris region does not affect the national average very seriously.

In mining regions and in the smaller industrial towns the pay of a miner, quarryman, mason, carpenter or other skilled worker does not ordinarily run above 4 fr. an hour at the best, and in some places averages nearer 3 or 3½ fr. an hour. At several large mine and quarry operations which I visited lately, employing together a good many thousand men, the average daily pay did not in any case rise above 24 fr.—say 95c. a day. In the Lorraine iron region it is higher—around \$1.28 a day for miners. In the north French coal mines exceptionally detailed and reliable figures happen to be available. These show that the underground miner averages from \$1.20 to \$1.28 daily in the three important Northern fields, while the surface worker in the same fields averages from \$1 to \$1.04 per day worked. Since some of the south French fields are on even lower pay scales, the final result is that the average French miner, underground and surface, in all French fields, received \$1.13 per day in 1926 and around \$1.24 last year.

In the mines I have seen, the piece-work scales are set so low that they rarely permit the piece-worker to earn

more than a common laborer on hourly pay—a condition that does not encourage the men to take over jobs on that basis. So one incentive to increased output is entirely lacking.

#### French Workers Have Limited Buying Power

Taking all the data into consideration, it seems probable that the French output of iron ore, coal, pig iron, steel and steel products, cement, clay products and all other heavy products is being made today on a wage scale that certainly

does not average over \$1.20 per day and more likely averages not much over \$1 daily. And, as I shall try to show later, a dollar does not go very far, even in France, in the way of buying food, clothing and shelter. As for the other things that our people have come to look upon as almost necessities, they are of course entirely out of the question. If Mr. Ford should try to market his car at \$100 in France, I do not think there are a hundred skilled laborers here who could afford to buy one.

## Locomotive Frames Cast on Edge

New Method of Molding These Large Steel Castings Found to Give Notable Results—Mold Made Entirely of Cores

FOR many years the conventional method of molding locomotive engine frames was "on the flat" through the use of a one-piece pattern and a long two-piece built-up flask. The molds therefore were long, unwieldy, quite difficult to handle and were likely to warp during the mold drying operations, unless every precaution was taken to prevent this.

Although engine frames molded by the method just mentioned are usually cast flat, a few attempts have been made during the past few years to cast them on edge, with varying success. The accompanying illustrations show the method used by the American Steel Foundries at its Chester, Pa., foundry in molding frames so that they may be successfully cast on edge.

#### Steel Form Instead of Flask

Replacing the flask is a machined steel form shown in one of the illustrations upon which cores forming the mold are placed in an upright position. The form itself is a substantial affair in a fixed or permanent location, being solidly bolted to a concrete foundation.

The sand portion of the mold consists of two sets

of dry sand cores in section. The back sections, the first placed in the form, contain the impression. The front sections are usually straight faced slab or cover cores. When all cores have been carefully put in place, they are backed up with heavy steel plates rigidly clamped into position which prevent any movement during the pouring operation. The bare form and method of clamping is shown in another illustration.

#### Cores Do Not Require Long Drying

The box from which cores are made is the usual rectangular wood affair, with a section of the pattern formerly used for flask molding built in for the impression. The cores, which are rammed on a jarring machine or sand slinger, are of such size that they are readily handled and do not require the lengthy drying ovens necessary for flask molded frames.

The form method of molding not only permits edge pouring of the casting, but also allows the placing of the gate and risers at such points as to assist best in accomplishing the desired results, symbolized in the third illustration—a solid casting.

## Tool Steels of the Chemical Analyses Shown Have Given Excellent Service

BY E. E. THUM

IN view of the fact that there are about 675 tool steel brands offered to American users by some 60 firms, the puzzled buyer may at times wonder which one is best for his purpose. If he wishes to judge by chemical composition, his problem is simplified somewhat. The adjoining table represents good practice—that is to say, fine steels

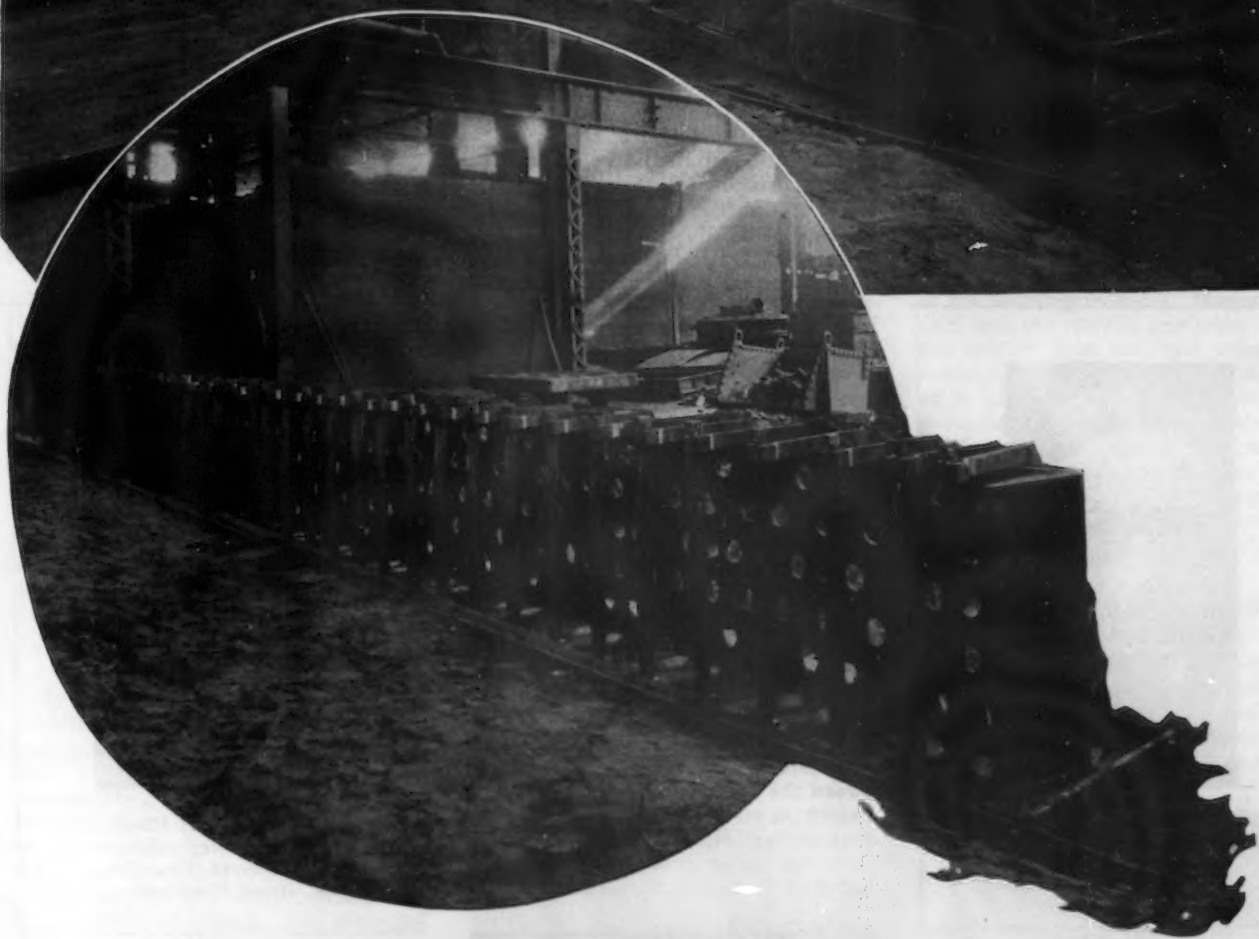
of the composition listed, when properly formed and heat treated, will give excellent service for the class of work indicated. It should be remembered, however, that there is one important ingredient in all tool steels which does not appear in the regular chemical analysis, and that is the craftsmanship of the steel maker.

Chemical Analyses of Excellent American Tool Steels

Plain Carbon Steels:	Carbon	Silicon	Manganese	Chromium	Tungsten	Vanadium
Sledges and hammers.....	0.60 to 0.70	0.25 to 0.30	0.25 to 0.35	All alloy metals (except perhaps vanadium) should be excluded		
Pneumatic tools.....	0.80 to 0.90	0.10 to 0.40	0.15 to 0.35			
Keen edged tools.....	1.1 to 1.3	0.10	0.10 to 0.20			
Non-deforming, oil-hardening steels for gages.....	0.80 to 0.95	0.30 max.	1.0 to 1.1	0.40 to 0.50	0.40 to 0.50	0 to 0.20
"Finishing steels".....	1.1 to 1.2	0.20 to 0.40	0.20 to 0.35	0.40 to 0.50	1.4 to 1.7	0.10 to 0.20
"Fast finishing steel" (Mushet).....	1.0 to 1.3	0.20 to 0.40	0.20 to 0.35	0.20 to 0.40	3.0 to 4.0	
Battering tools.....	0.35 to 0.55	0.30 max.	0.20 to 0.30	1.3 to 1.6	2.0 to 2.3	0.20 to 0.30
Hot-working dies.....	0.30 to 0.35	0.30 max.	0.20 max.	3.2 to 3.4	9.5 to 10.5	0.40 to 0.50
Cold-drawing dies.....	2.1 to 2.5	0.35 max.	0.50 max.	13.0 to 15.0		
High-speed steel (high-tungsten).....	0.65 to 0.70	0.25 to 0.30	0.25 to 0.30	4.0	18.0	0.80 min.
High-speed steel (low-tungsten).....	0.60 to 0.75	0.25	0.25	4.0 to 4.5	14.0	1.6 to 2.0
High-speed steel (cobalt-bearing).....	0.60 to 0.75	0.25	0.25	4.0	17.5	1.0.....

{ Cobalt 4.0 to 5.0  
Molybdenum 0 to 1.0





**I**N the Upper Picture One-Half of a Locomotive Engine Frame Mold, Using Built-Up Dry Sand Core Sections, Is Shown, So Arranged That the Frame May Be Cast on Edge. The central illustration shows the mold form with clamps and tie bars used to fasten in place the dry sand core sections which comprise the mold. The lower illustration reveals the final casting with gate and risers as it appears when removed from the built-up core section

# Mills to Cooperate with Fabricators

Program Outlined at Biloxi Meeting to Increase Markets and Stabilize Structural Steel Business

**D**EFINITE accomplishments in the form of a better understanding of the mutual problems affecting structural steel fabricators and the rolling mills of the country came out of the sixth annual convention of the American Institute of Steel Construction, Inc., which was held at the Edgewater Gulf Hotel, near Biloxi, Miss., Nov. 13 to 17. A partial report of this meeting appeared in *THE IRON AGE* of Nov. 15, page 1235.

Representatives of steel producers, on the one hand, expressed appreciation of the constructive work being

markets and protect the present high measure of prosperity.

The necessity for the structural steel industry to sponsor a comprehensive national advertising program to inculcate a "steel consciousness" in the minds of the architect, the engineer and the builder also was stressed.

Outstanding on the program was the annual banquet at which Charles M. Schwab, president of the American Iron and Steel Institute; Right Honorable Arthur Meighen, former premier of Canada; and Lieutenant-Commander C. E. Rosendahl, commanding officer of the United States airship *Los Angeles*, were the speakers.

more intelligently and that in order to do this the so-called anti-trust laws should be amended to permit of wider latitude in achieving the desired results. He declared that a one-price policy, if generally adopted by steel mills, would go far toward stabilizing conditions in the industry.

The foremost problem confronting those engaged in the development of airships is the creation of mechanical facilities for handling craft on the ground, said Lieutenant-Commander Rosendahl. The storage of helium gas in underground cylinders and in tank cars, as well as the construction of

## Assessments Increased to Pay for Promotion Work

That the members of the institute are desirous of expanding its promotion work was indicated by the agreement at the final session to increase the tonnage assessment of the members for the coming year so that the organization can assume full financial responsibility for its corps of district engineers. With the increased revenue accruing from this arrangement, it is probable that the number of district engineers will be increased from 10 to 14.

Mr. Schwab, in his address, stated that no plant of his would be allowed to compete with independent steel fabricators and that differences between the rolling mills and the fabricators should be settled by mutual cooperation. He reiterated his opinion that the major problem of the steel industry is to distribute its products



*Charles N. Fitts, New England Structural Steel Co., Boston, New President*



*W. M. Wood, Mississippi Valley Structural Steel Co., Retiring President*

done by the fabricators through the medium of the institute and voiced their desire to cooperate for the benefit of the industry as a whole. The fabricators, on the other hand, declared their satisfaction with the growing willingness of the rolling mills to assist in carrying on a program designed to increase markets and to stabilize conditions within the structural steel business.

Pertinent to this program was the declaration of Abram F. Myers, member of the Federal Trade Commission, Washington, that the Federal Government looks with favor on cooperative effort within an industry to bring about sounder economic conditions and that the anti-trust laws in nowise restrain cooperative action in that direction, provided that suppression of competition is not the motive. He advocated the extension of the powers of the commission to effect a "rationalization" of prices which will stabilize



*F. H. Frankland, Now in Charge of the Technical Service of the Institute*

hangars and of mooring masts, involves the use of steel.

## Rolling Mills Urged to Cooperate

That the rolling mills as a group should cooperate with the institute in carrying a reasonable portion of its budget and that there is much in the present situation to encourage the belief that ultimately such assistance will be given was the opinion expressed by President W. M. Wood, Mississippi Valley Structural Steel Co., Decatur, Ill., in his annual report. Mr. Wood discussed the relations of the fabricators with the mills, with the public and with their competitors, in the latter case pointing out that the joint activities of the members in the interest of a common cause have done much to break down old prejudices.

Mr. Wood further set down some of the factors which will bring profits to individual fabricators. He urged the



adoption of a cost accounting system and stated that unless an organization has a policy of adding a profit to its determined cost when submitting a bid it has no hope of success. He said that sales efficiency should be studied and developed far beyond the custom of most fabricating plants today and that a serious effort should be exerted to bring about a sane adjustment of supply to demand. Mr. Wood suggested that each fabricator make a comparison of his plant capacity with the tonnage which can reasonably be expected to come out of the territory in which he can operate most economically and then adjust his policies to conform to the situation. Some fabricators, finding their capacity greater than the business which they can reasonably obtain, have endeavored to improve their own position by reducing prices, thereby hoping to increase sales. However, the result has been that little, if any, more work has been obtained and, in addition, the jobs which would have shown a fair profit have been taken at a loss.

Declaring that fabricators should avoid scattering their sales effort, Mr. Wood proposed that they should develop a definite selling program and consistently adhere to it. In connection with this program each fabricator should make a careful study of the nature of the work which he can handle profitably, as well as of the classes and types of customers he can best serve. In concluding his report, Mr. Wood stated that the greatest need within the industry is sane and constructive leadership.

#### Uniform, Stable Prices Desired

**C**ULTIVATION of friendly relationships with rolling mills, especially with those having fabricating departments, was recommended to the association members by the mills relations committee, of which H. A. Fitch, Kansas City Structural Steel Co., Kansas City, Kan., is chairman. This can be accomplished by each fabricator operating within his own province and having respect and consideration for the province of others. The committee stated that "this is not a mere theory. It has the elements of a practical and immediate solution of the rather unsatisfactory competitive condition now existing in the industry."

Independent fabricators should recognize the logical existence of the present fabricating departments of rolling mills, while the rolling mills, on the other hand, should recognize the necessity and value of the independent fabricating plants as an important medium for the distribution of their products and therefore should foster and protect them in that capacity.

So far as stable prices for plain material are concerned, the committee expressed the belief that "a uniform and stable price on rolling mill products applicable to all projects and all fabricators alike, with certain logical differentials, would be a potent factor in enabling our industry to stabilize the price of its product."

Since any fabricator with a reason-

able assurance of uniform operation at a fair uniform profit would be willing to maintain his plant at 60 to 70 per cent of normal capacity, the committee urged the members of the association to establish as a cardinal principle this thought: "Uniformity not volume, coupled with a constant concern for the uniform operation of your competitor's plant as well as your own."

#### Says Associations Should Combine for Publicity and Research

**S**PEAKING of the significance of local trade associations in the steel industry, Dr. Frank Parker, executive director of the Structural Steel Board of Trade of Philadelphia, declared that the local structural steel board of trade can improve the internal relations existing between local fabricators and can facilitate, expand and intensify the work of the institute in preparing and developing adequate printed publicity by aiding, through personal contacts previously established, district field engineers in every phase of their work and by creating new contacts for the institute, enabling it to extend the different phases of its national program.

Admitting that the problems of steel mills differ from those of the fabricators, Dr. Parker stated that nevertheless the essential economies which might be realized from a combination of trade association activities should be considered. He pointed out that more efficient results per dollar of expenditure for publicity and research could be achieved in the iron and steel industry by having the program of the various associations devised and controlled by a central administrative staff. To insist that the existence of individualistic problems automatically estops united effort can hardly be regarded as following the rule of rea-

son. Dr. Parker said that "in dealing with this aspect of trade association work what is needed is an unbiased attitude of mind in order that the merits and demerits of this suggested program may be given a fair hearing. The need for this impartial pondering of the facts becomes more evident when the history of the inauguration of some of our trade associations is scanned."

Dr. Parker expressed the opinion that the movement toward consolidations in business enterprises may tend to check further expansion of trade associations, but, on the other hand, individual enterprises banded together in existing associations may, by cooperative effort, put the association movement on a sound and permanent economic basis.

F. H. Frankland, in charge of the technical service of the institute, outlined the activities of the institute's field engineers, pointing out the valuable educational work they are doing to arouse a "steel consciousness" on the part of the public, of the engineering and architectural professions and of the building industry. However, he said that the district engineers are of the opinion that this task cannot be accomplished without the assistance of a comprehensive advertising and publicity campaign to acquaint the public with the merits of structural steel. Incidentally, it has been possible to trace to the district engineers the decisions of builders to construct steel structures requiring 43,250 tons of steel.

#### Technical Research Committee Studies Welded Joints

**T**HE work of the committee on technical research has been confined to cooperation with the structural steel welding committee of the American Bureau of Welding, which was organ-



W. M. Wood, Retiring President of the Institute, Using a "Steel Carpenter," Which Makes It Possible to Cut a Steel Beam With a Blow Torch

ized to obtain reliable information upon which could be based safe unit working stresses in designing welded structures, stated Aubrey Weymouth, chairman, in his report to the convention. The committee studied all available literature giving the results of tests on welded joints from which unit working values could be deduced. To secure further data which would represent standardized conditions and which would give unit values applicable to the types of joint, thicknesses of material and sizes of weld most commonly encountered in structural steel work, a program was prepared covering 57 forms of joint in 191

tion, and each of these organizations will be asked to contribute by April 1, 1929, an amount similar to that donated in the past year to carry on the committee's work. The committee recommended that the institute appropriate its share of the money for this purpose.

#### Measuring Wind Strains on Steel Columns

A proposed investigation of measuring strains on the steel columns of the 48-story tower building of the American Insurance Union at Columbus, Ohio, was reported by the committee on wind bracing, of which



*Charles M. Schwab, Who Was the Principal Speaker at the Banquet, Also Played Golf at the Institute Convention. This foursome (left to right) was J. L. Kimbrough, Indiana Bridge Co., Muncie, Ind.; Mr. Schwab; Right Honorable Arthur Meighen, former premier of Canada, and C. M. Denise, McClintic-Marshall Co., Pittsburgh*

sizes welded by the arc and gas processes. Specimens were of the elemental type and embraced fillet welds of lap and tee form, end and butt welds and special joints. Single and double lines of weld, normal parallel and diagonal to the direction of the stress, continuous and intermittent, were specified.

#### Commercial Uniformity

To determine what degree of uniformity may be expected in commercial practice, multiple specimens of each type and size were scheduled and are now being prepared by about 36 representative fabricating shops of the United States and Canada. Operations will be governed by uniform procedure and inspection regulations. An important part of the program will be the keeping of records as to the sufficiency of these regulations. Because of the magnitude of the undertaking, it was decided to give the proposed program a preliminary trial. A series of pilot tests has been made by Prof. Peter Gillespie of the University of Toronto, these tests having involved the preparation and testing of 342 specimens. The results of the tests will be embodied in Professor Gillespie's report soon to be published.

The committee has received funds from the institute, the International Acetylene Association and the National Electrical Manufacturers Association,

Aubrey Weymouth is chairman. The committee was created by the board of directors in March, 1928, as a result of a paper presented at the 1927 convention by Prof. Clyde T. Morris of Ohio State University, and the institute has established a fellowship in structural engineering at Ohio State University for the college year 1928-1929. The investigation is being made by a fellow under the supervision of Professor Morris.

#### Structural Steel Hangars Are Declared Most Satisfactory

Airports to be self-supporting or to make a profit must be operated by as few efficient mechanics as possible, said Maj. Frank M. Kennedy, Air Corps, United States Army, in discussing flying fields. Every foot of space saved in moving a plane reduces handling costs and therefore a hangar 110 ft. wide, 20 ft. high and 120 ft. long is the most economical. These dimensions conform to the established ratio between width and height, determined by the fact that planes are four and one-half to five times wider than they are high. Major Kennedy stated that hangars of the structural steel type have proved to be the most satisfactory. He predicted that in the near future modern airports, so far as the housing and repair of privately owned planes are concerned, will be operated like an efficient downtown city garage.

A resolution authorizing the preparation of a standard form for contract proposals and its adoption by members of the institute was unanimously approved.

#### Better Bridge Designs Proposed

J. Horace McFarland, chairman of the Art Commission of Pennsylvania, admonished the members of the American Institute of Steel Construction to build more beautiful bridges. "The delightful flexibility of the material you use," he said, "the ease with which steel and cast iron may be combined in effective ways, will suggest to you and to those with whom you will associate yourselves forms not always on the same old pattern, but running into new lines of beauty no less efficient, no more expensive, but infinitely more slightly and therefore more satisfactory."

Definite steps to improve the design of steel bridges were recommended in a report of the committee on the aesthetic design of steel bridges, of which Clyde MacCornack, Phoenix Bridge Co., Phoenixville, Pa., was chairman. The committee recommended that an annual award be made to that bridge constructed during the year which would be chosen by a selected art jury as the most artistic in treatment. The bridge would be decorated with a plaque and complete engineering and architectural descriptions be published. In addition, the committee recommended that a report be compiled upon bridge design illustrated with some of the best examples extant, that the institute collect literature on artistic bridge design and that the problems of aesthetics in bridges be treated in lectures, etc.

Supplementing this work, it was proposed that a series of cash prizes be established to go to students in engineering and architecture, and others to practicing engineers and architects, for the best competitive bridge designs.

#### Charles N. Fitts New President

Charles N. Fitts, New England Structural Co., Boston, was elected president. Other new officers are C. M. Denise, McClintic-Marshall Co., Pittsburgh, first vice-president; Clyde MacCornack, Phoenix Bridge Co., Phoenixville, Pa., second vice-president; George Pistor, Hay Foundry & Iron Works, New York, treasurer; L. L. Gadd, Levering & Garrigues Co., New York, assistant treasurer. J. E. Miller, Bellefontaine Bridge & Steel Co., Bellefontaine, Ohio, was named a director to succeed C. A. Schneider, General Iron Works Co., Cincinnati, while the following members of the board of directors were reelected: W. M. Wood; A. J. Dyer, Nashville Bridge Co., Nashville, Tenn.; Clyde MacCornack; G. E. Klingelhofer, Pittsburgh Bridge & Iron Works, Pittsburgh; and James T. Whitehead, Whitehead & Kales Co., Detroit.

The members decided to return to the Edgewater Gulf Hotel for their convention in 1929.



# Managers Turn to Research

Necessary for Budgeting Industrial Activities, for Appraisal of Market Trends  
and to Develop New Lines—Profit Sharing for Executives

**R**ESearch and profit sharing by executives were two major topics considered by the American Management Association, meeting in Chicago, Nov. 12 to 16.

Research was defined broadly as any study, by Ralph H. Heberling, supervising engineer Business Research Corporation. Studies of this kind, however, require too much concentration and time for the manager to spare. He should therefore delegate them to an open-minded investigator who is competent to gather all the facts and analyze them. The conclusions are presented to the manager to act upon.

"Job analysis" falls within such a definition. Job analysis is the source of job specifications, which are as necessary for the employment department as are steel specifications to the purchasing agent. Mr. Heberling emphasized that thorough research is an essential preliminary to a satisfactory budget (defining "budget" broadly as a plan of what reasonably can be expected of an organization and of the ensuing profits). To construct such a budget requires a knowledge of the expected demand for the material produced, the capacity of the firm to supply that demand, and the revenue aspects of the transaction. Obviously research is necessary to determine the trend in the market and the causes thereof. Job analysis and equipment schedules are necessary to appraise the capacity of the organization to produce and sell. With such facts at hand the comptroller can make a reasonable forecast of costs, income, and profits.

It was pointed out in discussion that Mr. Heberling's program in its entirety would involve an immense amount of work, and that the manager's function would be to direct the research into those channels which would reveal pertinent facts on the most vital points. It was also mentioned that the principal difficulty a research director would find would be in the obstructive attitude of minor executives, who feel that research exists merely to criticize the existing order, rather than to help everyone do his job better and easier.

Edward P. Curtis, Eastman Kodak Co., Rochester, N. Y., emphasized the necessity of constant study to appraise the present and future market, since two million new people are added to the buying public yearly, and these youngsters are the ones who most eagerly adopt the novelties. This new purchasing power constitutes a threat to a stabilized product, and at

the same time the opportunity for a radical innovation in merchandise.

C. F. Hansen, director of research, W. T. Grant Co., New York, outlined how he is able to predict the profits of new chain stores to within 5 per cent. It is done by minute analysis of purchasing, advertising and sales costs, and comparing the various items for all stores grouped in various ways as to location, population, size, management, etc. New stores have their sales budgeted by the counterfoot according to his company's experience for that type of store, community, management and size, also giving due weight to related data from the trade association, and economic data about industrial conditions throughout the country generally.

Information from trade associations could be of great aid to such researches for budget making, in the opinion of Ernest F. DuBrul, general manager, National Machine Tool Builders' Association, Cincinnati. Unfortunately, too few of the members know the essential facts, and of those who do, many refuse to divulge them to the association. A complete statistical service by a trade association could be made into a most valuable measuring stick for the whole industry if these impediments could be surmounted.

## Research Which Pays

**A** DISTINCTION between research (systematic creative work along older scientific lines) and development (study of management, sales and production) was made by Dr. Z. C. Dickinson, Department of Economics, University of Michigan, Ann Arbor, Mich. At present, however, no one seems to know how large a percentage of the gross receipts should be devoted to such work. It is even debatable whether such investigations should be done in a centralized independent group (as is most scientific research) or decentralized in the various departments (as is most developmental and analytical work). Dr. Dickinson doubted that research is a separate function, any more than labor control is, since all departments have both with them constantly. Nevertheless he seemed to lean toward the view that research and development should be under one head, just as the labor policy is ordinarily in the hands of one man.

That these organization plans would vary from company to company was indicated by C. S. Redding, vice-president, Leeds & Northrup Co., Philadelphia. This plant has a shop engineer-

ing department responsible to the factory superintendent which intensely studies manufacturing processes, one by one. It has returned a profit since the month it was organized. The "research department," which studies the scientific aspects of the product and develops new designs, was in existence seven years before it accumulated a credit balance from royalties on the discoveries. In these early years the cost of this work was 10 per cent of the annual sales, but this proportion has declined to about 3 per cent where it has remained for the last 10 years, even though the total research expenditures are constantly increasing. Since the imposing balance now to the credit of research is due principally to discoveries of the early years, it is evident that recent expenditures have not been large enough, or have been misdirected. In Mr. Redding's opinion, as much money should be spent on research to develop new products as the sales department is able to capitalize upon.

## Profit Sharing for Executives

**A**N analysis of 65 profit sharing plans has been made by Dr. C. C. Balderston, assistant professor of industry, University of Pennsylvania, Philadelphia. He believes the general plan has been successful, for only four of the 65 concerns have abandoned the plan in five years. In all these plans only the executives participate in profit sharing, and the portion of net profits to be distributed is published a year in advance. Those who are eligible for a share are also notified at the beginning of the year, but the share is seldom fixed until the time of distribution. In about half the plans this share is related to the salary received; about as many others attempt to base it on estimated performance. Three quarters of the plans pay in cash; the rest are quite sure that payment in company stock is far preferable. In Dr. Balderston's opinion, honesty of purpose is of more importance than the method of administration. Such an aim will avoid many difficulties in selecting the list of participants and in apportioning the shares.

Profit sharing draws forth full efforts from executives, in the opinion of Dr. Ralph E. Heilman, dean School of Commerce, Northwestern University, Chicago, and therefore is a good managerial device. However, his observations show that it works best for the high men in small organizations, because in such circumstances the

greater responsibility gives a greater and more visible influence on profits and a better understanding of business vicissitudes and outside factors. Thus the participant understands fully what to expect in lean years. Dr. Heilman leans toward payment in

common stock, because then the executive shares losses as well as profits—i.e., his dividends on accumulated stock are small in lean years. He believes that salaries should be the basis for apportionment. If salaries are thought to be improper for this pur-

pose of figuring profit shares, then they are inequitable rewards for day by day achievements. However, Dr. Heilman believes the higher salaried officials should get a somewhat higher percentage bonus than the minor executives.

## Acetylene Meeting Discusses Pipe Welds

Leakless Joints Said to Warrant Adoption Even at Increased Cost—  
Improved Welding Rod Produces Non-Porous Welds  
in Alpha Brass Pipe

AT the twenty-ninth convention of the International Acetylene Association, held in Chicago Nov. 14 to 16, Herbert L. Whittemore of the United States Bureau of Standards was awarded the Morehead Medal for "outstanding research work in welding." This medal is named in honor of the discoverer of the electric furnace method of making calcium carbide, the fundamental process underlying the entire industry. Mr. Whittemore's contact with organized research into the properties of welded joints, and the safety of welded pressure vessels has continued for several years past. Previous recipients of the Morehead Medal include Noah Wagner, pioneer builder of welded pipe lines; Edmund Fouche, inventor of the blowpipe; and Augustine Davis, dean of the American acetylene equipment industry. Mr. Whittemore was also presented with honorary membership in the International Acetylene Association, together with E. J. Smith of Underwriters' Laboratory, H. E. Newell of National Board of Fire Underwriters, and A. D. Risteen of Travelers Insurance Co., Hartford, all for signal services to the acetylene industry.

New officers elected are president, L. F. Loutrel, Shawinigan Products Corporation, New York; vice-president, C. A. McCune, Page Steel & Wire Co., Bridgeport, Conn.; and secretary, A. C. Morrison, Union Carbide & Carbon Corporation, New York.

### Expansion in Use of Acetylene

Much discussion centered about the present status of the industry. Professor J. D. Hoffman, head of the Department of Practical Mechanics,

Purdue University, Lafayette, Ind., presented the accompanying figures indicating the growth of the welding industry since war times.

The oxy-acetylene committee of the association presented a 106-page report outlining the status of welding in various industries, and as viewed from various angles. In the opinion of the committee this survey proves that repair welding is expanding rapidly. Production welding is mostly confined to thin metal (furniture, barrels, storage tanks, utensils, automobile bodies, aircraft) and to pipe work (long transportation lines and industrial piping). Heavier plate work seems to be confined, at least as far as production is concerned, largely to the manufacture of unfired pressure vessels and chemical equipment.

At a meeting held jointly with the Gas Products Association (an organization of oxygen producers) the problem of expanding these production applications, by education or advertising, was discussed at length. It was pointed out that the designer and production man of tomorrow is the engineering student of today, yet it is well known that scant consideration is given welding as a joining method in most courses of laboratory or lecture instruction. Feeling that this is largely due to lack of information in the hands of the faculty, the two associations proceeded to organize a joint committee to promote the "education of the educators."

R. Witherspoon, of Shawinigan Products Corporation, Shawinigan, Canada, described the use of acetylene for synthesizing chemicals. In the last seven years his company has expanded to where it uses over a million cubic feet of acetylene daily, mostly

to make glacial acetic acid for the artificial silk industry. This is about eight times as much acetylene as all Canada uses for cutting, welding and lighting. At the indicated rate of expansion, Mr. Witherspoon estimates the American chemical industry by 1938 will be absorbing 1000 tons of carbide daily, ten times the present amount.

### Industrial and Refrigeration Piping

Three papers on this general subject were presented. A. F. Hoesel, chief engineer Peerless Ice Machine Co., Chicago, told how the manufacturers of refrigerating equipment and ice making machines had gradually expanded the use of welded joints. At first only ammonia receivers were welded, then headers for pipe coils, and finally practically all the joints in the ammonia system on both the high and low-pressure sides. Costs are sometimes higher than flanged joints, but the savings in refrigerant in a leakless cycle overbalance this in a short time.

This same economic consideration was urged by J. H. Zink, vice-president Heat & Power Corporation, Baltimore, who said that first cost of a welded pipe installation could be higher than a screw coupled and flanged job, and yet competitive bids could be placed, because the piping contractor using welding was thereby relieved of the necessity of repairing leaks in an installation during the guarantee period. Both Messrs. Hoesel and Zink said that in the five years their respective concerns have been utilizing welding as a manufacturing or erecting method there has never been a leaky weld reported. Mr. Zink is strongly of the opinion that the oxy-acetylene process will enable steam heating contractors to surmount many of their present obstacles when it is used to the maximum extent for pipe welding, bending, and the making of specials.

F. E. Sellman, Servel, Inc., New York, described the methods used to train welders for domestic refrigeration. The Servel unit is made almost entirely of seamless tubing, ranging from 5/16 to 3/4 in. in diameter, and

Production of Welding Gases

	1914	1919	1921	1923	1925
Dissolved Acetylene—					
Number of plants.....	40	49	49	58	69
Millions of cubic feet.....	120	320	300	525	730
Value, millions of dollars.....		7.1	7.5	13.1	13.5
Oxygen—					
Number of plants.....	57	94	94	121	141
Millions of cubic feet.....	140	1,170	1,060	2,050	2,075
Value, millions of dollars.....		16.6	14.0	23.4	22.6



wall thickness of 11 to 17 Birmingham wire gage. Manufacturing methods were described in THE IRON AGE for Feb. 2, page 321. In each unit 53 points are made, each of which must be tight against 900 lb. per sq. in. test pressure, and without interval "icicles." Twenty-one other welds make a total of 74 per unit, plus a considerable number on the metal cabinets and linings. It can be seen that the skilled labor to produce 250 such units daily represents a considerable problem.

Recently a plant of this capacity was constructed at Evansville, Ind. Profiting from previous experience, a welding school big enough for 50 students was immediately equipped; 50 girls were instructed on day shifts, 50 men on the night shift. Five instructors gave close attention to the work. The three principal steps in instruction are 1. Lay a bead on sheet metal. 2. Weld a flat seam in sheet metal. 3. Make welds in thin-walled pipe.

Apt students easily learn to make a neat weld, but it takes from three to six weeks to make one without internal icicles and which is tight against 900 lb. pressure. About half of those who start graduate. When put on production the new welders are still closely supervised; each joint as made is immediately tested under pressure, this practice continuing for weeks, and until the number of porous welds drops to less than one a day. Students are paid small wages during training; their rate is increased as ability in production is demonstrated. The Evanston plant is equipped with 184 welding stations.

#### Modern Swiss Welding Practices

A paper of the above title was presented by Prof. C. F. Keel, director of the Swiss Acetylene Association, Basel, Switzerland. His association is of semi-official character, being delegated with the authority to establish safety regulations and to make biannual inspections of all oxy-acetylene installations. In addition it conducts cooperative welding researches and a school for welders.

As a result of exhaustive tests, Swiss purchasers and engineers have removed all restrictions on the use of welding as a method of joining on boilers and pressure vessels, as long as the work is done in a plant known to utilize approved practices. Methods in use by Sulzer Brothers are typical, and have been described in THE IRON AGE, Sept. 6, page 567.

Welding technique as standardized in Switzerland is quite different from that accepted as best practice in America. Single vee butt welds are used, even on heavy plate, beveled to a 60-deg. opening. The blowpipe, producing a large flame having a considerable excess of oxygen, is held steadily at the very bottom of the vee, and the welding rod rubbed vigorously back and forth in the advancing puddle of molten metal. By such methods, Professor Keel says, good practice on

production in 1/2-in. plate will be as follows:

	Feet per Hour	Oxygen per Foot of Seam	Acetylene per Foot of Seam
Horizontal flat seam	4 to 5	12 cu. ft.	10 cu. ft.
Vertical side seam	5	9.6 cu. ft.	8 cu. ft.
Corner weld	10	7.2 cu. ft.	6 cu. ft.

Professor Keel said that since these revised practices and higher speeds had been attained, the amount of oxy-acetylene welding on heavy plate had doubled, at the expense of competitive processes.

American welding experts who commented on these figures, which are approximately twice as good as we are doing, were of the opinion that the Swiss welding technique makes joints with interior toughness when tested by bending so the bottom of the vee is stretched. Prof. Keel showed many slides of test pieces undoubtedly having high mechanical properties.

#### Bronze Welding Rod

It has been found by A. R. Lytle, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., that if 0.5 per cent silicon is added to best brass welding rod (of "Tobin bronze," which contains a little tin) the volatilization of zinc during welding is almost entirely prevented. Furthermore, such a rod when melted into a joint in alpha brass or admiralty brass pipe will check the boiling and zinc vaporization, and produce a strong union free from porosity. The silicon may protect the zinc by preferential oxidation and by forming a thin slag, and also by increasing the solubility of gases in the hot metal. Unreinforced welds in 60:40 brass were stronger than the base metal; Muntz metal broke at 39,000 lb. per sq. in. along the scarf, due to an accumulation of lead which boils out of the heated zone. Alpha brass pipe, welded with the silicon-bearing rod, broke some distance from the joint at an average of 34,500 lb. per sq. in.; screwed unions break at about 21,000 lb. per sq. in. by shear along the threads. The weld metal itself (melted welding rod) has an ultimate strength of 50,000 to 60,000 lb. per sq. in., and an elongation of 12 to 19 per cent in 2 in. The bond between bronze weld and steel or cast iron is also increased 10 to 15 per cent. An important practical advantage is that the silicon-bearing weld metal can be remelted without damage.

I. T. Hook, research department, American Brass Co., Ansonia, Conn., described some experiments on steel, welded with bronze while under internal stress. Strips of medium carbon steel, such as used for automobile frames, were bent slightly and while under known load were heated and bronze weld metal flowed over the stretched surface. It was found that incipient cracking frequently resulted when the stress amounted to 4000 lb. per sq. in., while at 6000 lb. per sq. in. the piece would be broken apart by this procedure. It appeared therefore

that the cracks frequently found in bronze-welded steel are due to a species of season cracking or corrosion cracking.

In the discussion it was pointed out that these results indicated that steel should not be bronze welded except in unimportant or non-stressed locations, as one could hardly guarantee internal stresses less than 4000 lb. per sq. in. except in annealed metal. It is also possible that the differential stresses set up between the hot weld and the cold metal adjacent would produce stresses in excess of the danger mark during the actual process of welding.

#### Coated Electrodes Make Sound Welds

At a meeting of the Pittsburgh section, American Welding Society, Oct. 31, P. R. Hawthorne, welding engineer Petroleum Iron Works Co., Sharon, Pa., argued the case for covered and coated electrodes for arc welding.

"In order to produce a weld which is free from oxygen and nitrogen," Mr. Hawthorne said, "the atmosphere must be prevented from coming in contact with either the arc, the metal as it is deposited, or the deposited metal until its temperature is below 1800 deg. Fahr. To protect the arc and metal vapor from open air by mechanical means would not be practical. The logical method is to liberate, by the heat of the arc, a gas which will form a sheath or envelope around the arc, of sufficient volume and density as to actually exclude or combine the harmful gases. This is most easily accomplished by using a chemical covering of the rod which will be consumed in direct proportion to its rate of melting.

"To protect the metal during the solidifying and cooling period, there must be provided a substance which will completely cover it. This also is easily provided by covering the rod with a chemical which will distribute itself over the deposited metal and exclude the air. This protective coating has the further advantage that it prevents too rapid cooling of the deposited metal. Finally, to produce a perfect weld which is greater in tensile strength than the electrode, it is necessary to introduce certain elements which will absorb completely the impurities in the welding rod and parent metal and cause them to rise to the surface of the weld."

Assurance that the acceptors really follow out the provisions of the simplified practice recommendations of the commercial standards group of the Bureau of Standards, both in buying and selling, is indicated in the reports of surveys made on seven projects. Based on factual surveys, 82.33 per cent of the output of the commodities covered by these seven projects were in conformity with the adopted simplified schedule.

# Operation of Open-Hearth Furnaces

## Practical Problems Covered at Superintendents' Meeting—Quality Control for Steel a Live Topic

**A**BOUT 70 men interested in open-hearth work, mainly from the operating end, gathered at the William Penn Hotel, Pittsburgh, on the morning of Nov. 15 to discuss problems coming up in their work. This was the fall meeting of the Open-Hearth Committee of the American Institute of Mining and Metallurgical Engineers. The meeting lasted through three sessions, adjourning on Friday noon to permit the members to make a visit to the Edgar Thomson works of the Carnegie Steel Co. at Braddock, Pa.

In opening the meeting, Leo F. Reinartz, chairman, brought up the question of the open-hearth question-

naire, and reported that only twelve plants had sent in specifications and six had sent in drawings. He thought it doubtful if it would pay to go ahead in the preparation of this work without a larger response. At the same time, the question was raised as to whether the minutes of the meetings should be printed and, if so, who should be entitled to receive copies.

As has been the practice for some time, there were no set papers. A list of topics on definite subjects was opened for general discussion. The three sessions were devoted to (1) construction of furnaces, (2) quality control and (3) furnace operation.

under these conditions. It is usually placed about 3 or 4 in. above the highest point at which slag cutting occurs. It is, of course, not needed with sloping backwalls.

### Charging Equipment

Reports were made by one superintendent after another as to the number of locomotives, charging buggies, boxes or pans, charging machines, stock house cranes, hot metal cranes, etc., in use. This can best be expressed in tabular form as given in Table I.

### Accounting for Repair Costs

Generally speaking, the larger repairs or rebuilding are taken care of on a job order and charged against a reserve set up for this purpose on the basis of past experience. Smaller repairs, which go on week in and week out, are charged ordinarily to operating expense. In many cases, new portions of the equipment are put into capital account whenever they represent an actual addition to the capital value of the plant. This, of course, is not so in mere replacements, however extensive or expensive they may be.

Some discussion came up as to whether costs of heating up the furnace after a general repair should go into operation or maintenance charges. Some men reported one thing and some another. In some cases the criterion came on the question of whether gas was on the furnace or not. Usually operating costs were charged with all hot repairs.

Rebuilding costs as a function of furnace sizes were discussed briefly, it being the consensus of opinion that about 5c. to a ton of steel would represent the difference between furnaces

## Elements in Construction of Furnaces

**N**INE topics were scheduled for consideration under the general heading of furnace construction. Owing to time limitations, however, three of the topics were not discussed. The six others follow in order of presentation before the meeting.

### Water Cooling of Furnaces

Various members told of the practice in vogue in their plants with regard to cooling portions of the furnaces by means of water. Doors and frames, bulkheads, bridge walls, ports, valves, etc., were pretty generally listed as being subject to this practice. Opinions differed, however, with regard to cooling of skewbacks. Some plants had experimented with this, with indifferent success. The brickwork did not stand up well and the roof was cut, which was laid in one instance to suspicion of moisture from the cooling pipe.

In general, it was reported that cooling is practiced in places where the brick shows a tendency to cut away, the object being to save on repairs and on delays for this purpose. The recirculation of the water was reported by some plants, although most of them do not use the water twice.

Consumption of water per furnace in 24 hr. was reported at figures varying from 700,000 gal. to 1,000,000 gal. Water was used at initial temperatures varying from as low as 60 deg. to 115 deg. Fahr. Some plants reported trouble from poor water, whether from mud and silt or from scaling due to hard water. Strainers are not always able to keep out the silt.

One plant reported using a closed system in which the water is circulated through a spray pond and about 500,000 gal. are in circulation at all times. The daily make-up water runs about 375,000 gal.

Water cooling along slag lines was reported by some plants, one of which has been using this practice about five years. At first there was some difficulty in holding the magnesite against the water-cooled surfaces. This was found to be due to putting it in too generous doses. It now is applied a little at a time and burned on hard before the next batch is placed and the trouble has disappeared. This practice was reported to give a good foundation for the jambs.

Saving of brickwork and extension of the life of the backwalls by 15 or 20 heats was reported as the principal reason for using coolers at this point. Bricklayers can make a much better job in laying up front and back walls

TABLE I—CHARGING EQUIPMENT OF OPEN-HEARTH PLANTS

Plant	Furnaces		Buggies		Locomotives	Boxes	Stock Cranes	Hot-Metal Cranes	Charging Machines
	No.	Size	No.	Size					
A	11	150 to 300 t.	100	4-box	500	2	3	2	4
B	12	80 t.	...	...	...	2	3-10 t.	1(a)	3
C	4	75 t.	92	...	...	1	...	...	2
D	8	50 t.	(b)	...	...	(b)	...	...	2
E	12	75 to 85 t.	83	4-box	...	...	2-10 t.(c)	...	...
F	12	80 to 175 t.	190	3-box(d)	600	2	4	...	3
G	8	80 t.	52	4-box	...	1	1	...	...
H	12	100 t.	263(e)	...	...	2	...	...	4
J	12	...	100	...	1,200	2	...	...	3
K	6	100 t.	73	4-box	300	2	2-15 t.	...	2
L	6	...	...	3-box	...	1	3	...	2

(a) And one of 10 tons. (b) Included in C; both in same plant. (c) And three gantry cranes. (d) 60 of them are 4-box. (e) 90 in open-hearth department; others distributed in other departments, to gather their scrap.



of considerable variation in size. In some cases, however, this difference was expressed as being as high as 15c. Furnaces compared in this manner were 68-ton against 115-ton and 40-ton against 85-ton, each pair in the same plant.

Whether each furnace should be handled independently of the others in cost keeping occasioned considerable discussion. Several speakers advocated a sharp distinction, because in no other way can accurate determination be made of the effect of changes made experimentally on a furnace for the purpose of improving operating conditions or reducing operating costs. One man reported taking the average of the three previous years as a basis and setting that up as a bogey for the next year's operation. Year by year this bogey would change a little, but it would remain at about the same level.

### Organization of Plant

Superintendents reported the number of men required for operating plants of varying sizes, with varying numbers and capacities of furnaces. These differed so markedly with the conditions in the plant that no general statement can be made regarding them. They are, however, covered briefly in Table II. The number of men per furnace is seen to vary all the way from 21 up to 40. In a few instances the plants are operating on 12-hr. shifts, and these naturally use a smaller number of men. These reports cover everything relating to operation, including engineers for the locomotives handling stock (and usually delivering steel to the blooming mill), mechanical men, electricians, ladle lining; even in one case the skull crackermen were included. All repair men except the brick gang came under this heading.

Lining of ladles was discussed at some length, particularly with regard to use of a gun to put clay against the refractory brick. One man reported using a gun for about 10 min. on each ladle after each heat, putting a thickness of  $\frac{1}{4}$  in. on a backing of 5 in. of brick. He reported getting 26 heats average out of the ladle before having to renew brick. Another man who put the material in by hand uses about 2 in. of ganister with enough clay for

a binder on the surface of the brick. In this case there are two layers of brick  $2\frac{1}{2}$  and 4 in. in thickness, with  $1\frac{1}{2}$  in. of clay mud against the steel shell.

### Keeping Mud Out of Steel

On the question of whether the mud or ganister gets into the steel, one man reported mud-lined ladles running as many as 50 to 150 heats on a brick lining without any such trouble. He does, however, burn this mud lining on very hard by means of an oil flame.

Another man reported using ganister with a gun as coating for a hot-metal ladle of the Pugh type, and said that the skull obtained was very small, rarely reaching 0.2 per cent. Ladles of this type were reported as handling from 19,800 to 31,800 tons of metal before relining was necessary. Another speaker, however, stated that he had tried this kind of lining and found that it peeled off badly, so he had given it up.

Special checker brick of the Loftus type have been put into a number of furnaces, some of which were reported upon. In one case, a 20-ton acid-lined furnace, making steels mostly from 0.25 to 0.30 per cent carbon, and tapping as high as 2900 deg. Fahr., was redesigned from a gas-producer furnace into one burning fuel oil. Originally all the regenerators were equipped with 9-in. brick. After running for 9 months these straight brick were taken out of what had been the gas chambers and Loftus bricks were put in, without making any change in the air chambers.

### Loftus Brick Keep Clean

This furnace has now been running 4 months under the new arrangement and the checkers appear to be clean from dust and show no cutting or deterioration. They are carrying most of the load, as the old air checkers have been found to be practically inoperative. Clay brick are used below, and silica on the top, the opening being 6 x 6 in. A new furnace, being installed in this plant, will be equipped entirely with Loftus checker brick.

Another superintendent reported having made the same sort of change from a gas-producer furnace to put in Loftus bricks. The checkers were re-

ported clean, most of the dirt having been washed down into the sewers. The throat between the checkers and the flues, however, was badly choked up. After 285 heats this roof had to be renewed and most of the checkers were taken out. They seemed to be about as good as new, but there was much dirt in the lower parts of the flues.

Another speaker reported that furnaces fitted with Loftus brick in the air chambers and regular 9-in. brick in the gas chambers, using producer-gas, are working faster and better than with 9-in. brick all around. This same story came from another source, in which it was said that after 120 heats the regular furnaces had to be shut down for cleaning flues, whereas under the new arrangement a much larger number of heats could be run without stopping. In this case the furnace was making steel faster to the extent of 0.8 ton an hour, and was using less oil by about one gallon a ton.

### Stevens Open-Hearth Furnaces

Brief description was given of a 25-ton acid-lined furnace at Indiana Harbor, which has been operating nearly two years under the Stevens arrangement. The furnace is built largely of structural steel, is covered with steel plate to the floor line or above, and is insulated. The covering includes the regenerators and slag pockets. The chambers are under the hearth of the furnace and have 13 ft. depth of checker brick, with a top area 9 ft. 6 in. square. The top layers of the brick are silica and the lower portion clay. After 500 heats the furnace had to be shut down because the regenerators became clogged up, having only  $3\frac{1}{2}$  x  $3\frac{1}{2}$ -in. openings. At the time of the report 1014 heats were out and the superintendent thought the furnace was good for 2000 heats. The slag pockets are cleaned occasionally and the roof is said to be in fine condition.

Air supply is by means of a fan, with the amount carefully proportioned. Control of this amount is by a Stevens valve. The stack draft is handled about as is usual on other furnaces.

Good operation on furnaces depends in large measure on uniformity of operation, and this was reported to be obtainable on furnaces without the Stevens control. It was claimed that as good fuel economy can be had in regular furnaces, by careful attention to uniform operation, as in the Stevens type. On a standard set-up open-hearth men have been operating their furnaces for specific purposes about as boiler men are said to operate their boilers.

These furnaces are scheduled, for foundry use, to tap their heats at certain hours, and it was said that they can come, usually, within 7 min. of the specified time. This is being done in shops having one, or two, or three furnaces; oil flow meters, indicating, recording and integrating, are used; there are differential draft gages and

TABLE II—OPERATING FORCES IN OPEN-HEARTH PLANTS

Plant	Furnaces		Total Men	Men per Furnace	Third Helpers	Dolomite Machine
	No.	Size				
I	4	85-ton	...	21	No	Used
II	11	80-ton	...	40	No	Used
III	5	.....	...	29	1 for 2 fces.	Used
IV (a)	4	75-ton	...	30	Yes	.....
V	12	.....	...	30	.....	.....
VI	10	60-ton	...	33	.....	.....
VII	12	80-ton	...	37 (b)	.....	.....
VIII	7	100-ton	...	25	.....	.....
IX	11	150 to 300 t.	390	36	.....	.....
X	22	60 to 85 t.	...	37	.....	.....
XI	8	65 to 85 t.	217	27	.....	Used
XII	8	80-ton	178	22	.....	Used
XIII	5	40-ton	...	26	.....	.....
XIV (c)	6	60 to 90 t.	...	40	.....	Used

(a) Runs 12-hr. turns. (b) Includes skull cracker labor. (c) All bottom-poured ingots; plant runs 12-hr. turns.

recording CO<sub>2</sub> meters between each furnace and the stack.

A letter was read from Carl W. Peirce, formerly superintendent of open-hearth, Mansfield Sheet & Tin Plate Co., stating that the Stevens furnace at Indiana Harbor was the best open-hearth job he ever saw, from the engineering standpoint. He even predicted that in three years the present method of operating open-hearth furnaces is likely to be obsolete. The new method takes the element of guesswork out of the subject of combustion. Just enough air is used for proper combustion. He reported very small accumulations of slag—only about 6 in. in each pocket—and about 1 in. of dirt on checker brick. The yield was said to be 2 per cent better, oxides in the slag less by one-third, pig iron in the charge less by one-third, and loss of castings cut in half.

Former fuel consumption of 44 to 56 gal. to the ton was reported to

years ago in England, and said that by 1900 the 50-ton furnace had become common. At that time, however, much doubt was expressed as to whether the size and depth of the bath could be greatly increased to advantage, and the question of taking care of enormous volumes of slag was held to be a governing condition. Excessive chilling of steel in a big ladle seemed to be a bugbear.

However, economically the value of the big furnace is found, both in operating cost and in maintenance of quality. Originally one plant had seven furnaces designed for 105 tons each. These were first operated eight years ago. Gradually these furnaces were charged more heavily, first up to 130 tons and then to 150 tons, at which point six of them are run today. Last year three new furnaces were installed, of 250 tons each, and one of the older furnaces was remodeled to take that same amount. Last April the first heat was poured from a new

metal and other materials on the charging floor, four ladle cranes and three pouring platforms, each capable of pouring two ladles at once. The 250-ton and 300-ton furnaces are emptied into two ladles at each tap through a Y-spout. As a result, all ladles of metal in this shop carry from 125 to 150 tons each.

A slightly greater yield was reported on the deeper bath, this being due, according to the speaker, to a smaller amount of oxidation, because there is less surface exposed for each ton of steel in the bath. The largest furnace produces 17.3 tons of steel an hour for each 1000 sq. ft. of hearth area. There is comparatively little bottom trouble. Coal, when the furnace is new, runs about 420 lb. to the ton of ingots, and reaches 480 lb. when the furnace is about ready to go off for repairs.

Another shop reported about the same sort of experience on large furnaces. In this case there is one furnace of 175 tons and one of 140 tons, whereas all the others in the shop are of 80 tons. Rebuilding and general costs for the larger furnaces are less per ton of steel. This speaker thought that 300 tons was about as large as a stationary furnace can well be operated. He believed, however, that some saving might be made by going to a 450-ton tilting furnace. He believed that it would be difficult to design a satisfactory spout for three ladles of 150 tons each.

At this point the chairman referred briefly to an article in *THE IRON AGE* of Sept. 20 last, page 693, in which Carl W. Peirce advocated the use of tilting furnaces, as an improvement over the stationary type.

TABLE III—BATH SIZES IN LARGE STATIONARY FURNACES

Number of Furnaces	Unit Size	Bath Area		Depth of Bath
		Length	Width	
Six	150 tons	40 ft.	16 ft.	2 ft. 6 in.
Four	250 tons	45 ft.	17 ft.	2 ft. 10 in.
One	300 tons	49 ft.	19 ft.	2 ft. 10 in.

have been reduced on the first 500 heats to 23.68 gal. This, however, was figured on the *net* ton of the *charge*, and not on the *gross* ton of ingot production. The saving on oil alone was said to be \$90 to \$100 a day. On this basis the cost of the change-over was figured as covered in 250 working days. Brick work results are as yet not ascertained, but it was said the saving here might reach 50 per cent.

One speaker credited Mr. Stevens with selecting in his furnace arrangement all the best principles of the open-hearth and eliminating all of the worst ones. When it comes to controlling a schedule for tapping heats, however, this speaker said that the beginning lies with the purchasing agent, and particularly with the type of material he buys to make up the charge. Then comes a proper segregation of the materials in the stockyard and good selection of those materials by the stock foreman in making up in the charge. This permits scheduling furnaces as much as two weeks ahead.

A brand new furnace of 100 tons capacity, on the Stevens principle, was reported going in at the plant of the Laclede Steel Co. In this case the regenerators will not be directly under the furnace, but will be a little off to one side.

#### Value of Large Furnaces

Considerable discussion centered around the ultimate size of open-hearth furnaces. In tracing the history of this subject one speaker referred to the 3-ton furnaces built 60

300-ton furnace. The hearth sizes and depth of bath of these furnaces (all of which are stationary) are shown in Table III.

To operate the shop containing these 11 furnaces there are four charging machines, two cranes handling hot

## Controlling the Quality of Steel Produced

EIGHT topics were listed in the program under the general heading of "Quality Control." Seven of these were covered during the second session, while the other was taken up at the beginning of the third session. The first topic under the general heading was a résumé of two years of research work on the influence of iron oxide on metals, as well as the formation and identification of inclusions such as iron oxide, manganese oxide and silicates. This was presented by Dr. C. H. Herty, Jr., of the United States Bureau of Mines, Pittsburgh.

Generally speaking, heats will clean up from an excess of silicates in from 12 to 18 min. after an addition of ferrosilicon in the bath. These heats, of 0.10 per cent carbon steel, are ready to tap in from 10 to 25 min. more. With a higher carbon, however, around 0.18 per cent, the reboil is not over until 20 to 26 min. after the addition has been made. These conditions, as well as the increase of FeO, were illustrated by a number of charts shown to the meeting.

Holding the steel in the ladle for a short period, to get rid of inclusions by permitting them to rise to the surface, was advocated by the speaker.

If, on the other hand, the steel is teemed very quickly after it gets into the ladle, it will not clear up properly and the inclusions will be found in the ingots. Study of chipping costs, in cases where ingots were segregated as to time of pouring in the heat, showed these costs much higher for the last ingots teemed than for the earlier ones.

Methods of taking out a sample were discussed, some members questioning the ability of the sample taker to get clear steel without considerable slag in it. This point of view was disposed of by Dr. Herty by the statement that the slag is already solid on the spoon before the steel gets into the spoon, that it remains solid after the steel has been poured out cleanly from the spoon, and that the steel samples would clearly show the fact if there were slag inclusions in them.

Changes in operating conditions in the blast furnace were reported to increase the proportions of oxides in the iron. The same is true of silicates, whether the silicon in the blast furnace is going up or down. Only when conditions are about stable are low silicates to be expected.

When putting ferromanganese and



ferrosilicon into the bath, the speaker recommended putting the ferromanganese in first, and then adding the ferrosilicon as soon as the ferromanganese has melted. If this is not done, all the MnO will be worked out of the bath before there is opportunity to use it in handling the silicon and the work will have to be done all over again.

This report became the basis of a steady volley of questions and answers on various phases of the topic as reported.

#### Difficulty in Welding Skelp Steel

Nickel, copper, lead and tin in the charge, or remaining as residuals in the steel, were cited as elements which increase the difficulty of welding skelp steel. One man reported that, if the nickel is more than 0.05 per cent, there will be trouble. Another man makes every endeavor to keep the nickel under 0.08 per cent and copper under 0.12 per cent. In his plant he likes to keep the phosphorus rather higher than the 0.04 or 0.05 per cent recommended by other speakers, letting it go up to 0.07 or even 0.09 per cent.

In bottom casting of ingots trouble is experienced from the steel carrying part of the runner brick or slurry into the mold; hence, top casting is employed when the steel is to be made into skelp. In some plants which do not employ top pouring trouble was reported in the welding. A distinction was drawn here, however, regarding the type of welding. With gas and electric welds, copper content seems to make no difference, whereas with the customary welding in a pipe machine it is deleterious.

#### Reducing Pipe in Special Steels

Manufacture of steels containing 0.20 to 0.30 per cent carbon, 0.70 to 1 per cent manganese, and 0.10 to 0.15 per cent sulphur was discussed from the point of view of reducing what many makers find an excessive amount of pipe in the ingots.

Several speakers reported having a great deal of trouble from pipe with steel of this type, although most of the men present had had little experience with this particular specification. Keeping the tops of the ingots clean by means of thorough killing of the steel was recommended as a palliative. One superintendent reported that on this type of steel all he can count on getting in the shape of sound billets is 70 per cent of the ingot, whereas for the more usual steels he gets from 85 to 88 per cent in good product.

#### Cracking of Ingots in Rolling

It seemed to be the general opinion that ingots poured on the bottom cast principle rarely crack in the blooming mill. Only when rolling top cast steel is this trouble encountered, and one man expressed the view that most of the top cast ingots crack during rolling. The distinction between the two methods of pouring was brought

out in connection, particularly, with a 3-high 46-in. bloomer in which 19 x 22-in. ingots are reduced to 7½-in. blooms in nine passes.

Most of the open-hearth men admitted frankly that this trouble can be traced in very many instances to the open-hearth department. Part of this difficulty was ascribed to teeming the ingots at too high a temperature, resulting in surface blowholes or those very near the surface. Use of graphite wash in the molds was reported to assist the steelmaker here in avoiding cracks on low-carbon steel, but they show up just the same on rail steel.

Heating of the ingots in the soaking pits was blamed by some speakers for the tendency of ingots to crack. Pin-head blowholes near the surface of the ingot were said to be very sensitive to the soaking pit gases, and the ingot under these conditions will cut badly on the surface.

#### Heater Should Know Steel Condition

Ordinarily, the heater does not know what the condition of the steel is in this respect and can therefore do nothing to remedy the situation. One plant reported an attempt to keep the heater informed so that he could handle the steel to better advantage. It was the opinion that neither the mill drafts nor the speed of rolling could be held responsible for these cracks.

Uneven heating, slag inclusions and thin-skinned ingots were given as primary causes by one metallurgist. Another man thought that many of the vertical cracks are caused by insufficient radius in the corner of the mold. He reported changing this radius from 2½ to 4 in. and getting away from most of the trouble. Another speaker recommended getting the steel into the soaking pits hot, even before it is set, and letting the heater know what the condition is so that he can carry his gases in a way to avoid cracking. If, on the other hand, the steel is allowed to cool so that, when stripped, the corners show black, nothing the heater can do, in the opinion of this speaker, can help.

#### Molds Partly Responsible

Faulty mold design and occasional cracks from stickers in the mold were charged with a share of the responsibility. But the main cause was reported to be the way the steel is made, with temperature a very large factor. One man reported having gone to the use of corrugated molds, after which he got rid of the trouble. These are almost parallel sided, having only ¼ in. taper, and considerably less scrap is produced.

When the interior of an ingot, as shown by microscopic examination, is found to be clean, some of the same ingots occasionally show on the surface a residue of undetermined composition. This was ascribed by one speaker to dirt in the mold. Another man said that graphite mold wash, if the graphite happens to be high in ash

content, will mark the surface of the ingot.

Titanium gives a cleansing effect through quickly working gases through the molten steel. In plants where this is used some judgment is required as to quantities and an effort is here made to keep the aluminum additions down. One speaker, however, reported that additions of titanium show a tendency to produce a thin-skinned ingot and thus cause cracks in rolling.

#### Titanium and Aluminum in Rimming Steel

Another man reported using titanium, particularly on small ingots, but reported that aluminum was just as good a deoxidizer on the larger sizes. A plate mill man said that, when he reduced the amount of titanium previously used, the plant immediately got into trouble from seams in the steel. Still another man, who reported trying to get away from the use of titanium because of its cost, said that he had always had to go back to it, because of complaints on seams, received from the sheet mill.

Other speakers reported an advocacy of spiegeleisen as a deoxidizer and said that they were not using either titanium or aluminum at all. Spiegeleisen was reported to clean up rimming steel in good shape, about 1000 lb. being added in the furnace on an 80-ton heat, about 25 min. ahead of tapping time, when making steel of 0.08 to 0.12 per cent carbon.

#### Best Slag Conditions for Low-Carbon Steel

Discussing what silica content the slag should have when the open-hearth furnace is making steel of 0.08 to 0.11 per cent carbon, and the best content of FeO and Fe<sub>2</sub>O<sub>3</sub> in the slag, Doctor Herty advocated 14 to 19 per cent silica in the slag, and 16 to 22 per cent iron oxide, without distinguishing between the two forms. This is for rimming steel, and it was said that, if these figures run too low, the steel will not rim well in the mold.

Slag samples should be taken from at least three doors, then mixed and crushed. Passing them over a magnet will remove the iron content and the slag is then ready for analysis. Generally speaking, it is found that a higher line content in the slag is associated with a higher Fe<sub>2</sub>O<sub>3</sub> content, and vice-versa.

Determination of FeO was had by analyzing for total Fe and for Fe<sub>2</sub>O<sub>3</sub>, taking the difference as FeO.

#### Report on Isley Furnaces

Two open-hearth furnaces of 100 tons each in one plant have been fitted with a combustion control system, on the Isley principle. These units measure 15 ft. 6 in. by 38 ft. inside the brick at the bath level. Each is operated with the aid of two No. 90 Sturtevant fans, driven by 75-hp. d.c. motors. It is found necessary to maintain a nice control, or balance, between the effect of draft at one end of the

furnace and pressure at the other end. Otherwise it is very difficult to control the flame.

Comparing the operation of these two furnaces with the best working furnace in the shop, not fitted with this system, some decided improvements in operation have been observed. The steel made is mostly dead soft. The best furnace has been making 8.2 tons an hour, whereas the two Isley furnaces have averaged 9.18 tons an hour, thus showing an improvement of the order of 12 per cent. Each of these furnaces has had one rebuild, having turned out an average between them of 45,312 tons of ingots. This is 8 per cent more than the run of the best other furnace, which produced 41,834 tons. The roof life was reported to be about equivalent in the two cases. Fuel consumption to the ton of ingots was said to be  $8\frac{1}{2}$  per cent better than for the best other furnace. Operating costs were estimated at 10 per cent better.

While the checkers were practically clogged up at the end of 320 heats, draft was still maintained in good condition by forcing the air or products of combustion through by means of the fans. Gas consumption for each ton of ingots on the Isley furnaces figured out at 5,812,000 B.t.u.

#### Obtaining Thick-Walled Ingots on Rimming Steel

Dropping of the steel in the mold a matter of 4 or 5 in. was reported by one speaker as making the blowholes very deep seated—sometimes as much as 4 or 5 in., inside the skin. These thick-skinned ingots, however, have to be heated a long time to obtain proper rolling conditions. One plant, which has a  $2\frac{1}{2}$ -hr. minimum heating period, stretches this out another hour if for any reason it is felt that the steel needs it. The speaker was not certain whether a 3-in. skin is better than a skin of  $\frac{1}{2}$  or  $\frac{3}{4}$  in.—that is,  $\frac{1}{2}$  or  $\frac{3}{4}$  in. might be adequate for good rolling. On sheet bar the average in this plant was given as  $2\frac{1}{2}$  in.

Slag conditions and the temperature of the bath are regarded as important factors by some operators. The use of fluorspar was advocated in creating a slag which would be suitable. This speaker considers  $\frac{3}{4}$ -in. skin thickness adequate for good rolling and is satisfied in some cases with  $\frac{1}{2}$  in.

Another man stated that the matter depends upon the temperature at which the heat is tapped, the temperature of the molds and the speed of teeming the heat. Bottom-pour ingots practically never crack in rolling, it was said, because they are poured so slowly that they naturally obtain a thicker skin than with hot pouring of the same steel.

Another report laid poor steel to improper action in the bath, resulting from the use of pig iron too low in silicon. In this plant iron is desired with 1.25 to 1.35 per cent silicon, rather than 0.75 per cent. This speaker

thinks that the proper place to produce good quality is in the open-hearth furnace. In his plants slab ingots are made in large numbers. He finds that the thicker ingots give better results than the thinner ones. For instance, an ingot 21 by 48 in. gave much poorer results than with the larger molds, measuring 30 by 70 in. or 40 by 90 in. This he attributed, in part, to the more rapid filling of the smaller in-

got, poured from the same nozzle and with the same quantity of steel to the minute. This factor was emphasized by his statement that most of the defects in the steel are found in the ingots first poured, because when the ladle stopper is first opened up the stream is faster on account of the greater head of metal over it.

(To be concluded)

## Gray Iron Institute Now Has 83 Members

### Some Results Already Achieved, Notably the Elimination of Unfair Practices, Say Reports at Annual Meeting

CONSIDERABLE work has been accomplished for the gray iron foundry industry since the organization of the Gray Iron Institute, according to the report of its president, Walter L. Seelbach, at the first annual meeting of the institute held at the Cleveland Chamber of Commerce, Cleveland, Nov. 14. He stated that the mere existence of the organization is having a good effect in that there are evidences that some unfair practices are being eliminated. Arthur J. Tuscany, manager, reported that 17 members had been enrolled since the starting of a membership campaign last month and that the institute now has a membership of 83.

Preliminary reports were made on the organization of a research committee by B. H. Johnson, Cresson-Morris Co., Philadelphia, vice-president; on a merchandising committee to study distribution problems by Don McDaniel, Hamilton Foundry & Machine Co., Hamilton, Ohio; on a finance committee by Edward B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill., and on plans for cooperation with existing organizations in other branches of the foundry industry by A. E. Hageboeck, Frank Foundries Corporation, Moline, Ill. He pointed out that the formation of the institute offers opportunities for cost study. H. S. Chafee, Builders' Iron Foundry, Providence, R. I., gave a summary of the financial status of the institute.

An expression of appreciation of his cooperation in the organization of the institute was extended by the directors to Dan M. Avey, editor of *Foundry*, who served as organizing secretary previous to the completion of the formal organization. Mr. Avey was presented with a golf bag and set of golf clubs.

Thirteen of the old board of directors were reelected and two vacancies were left on the board. It is planned to fill these during the year by foundrymen located in districts not now represented on the board. Those reelected were: J. H. Bruce, Bowler Foundry Co., Cleveland; J. L. Carter, Barlow Foundry Co., Newark, N. J.; H. S. Chafee, Builders' Iron Foundry, Providence, R. I.; A. E. Clarke, Des Plaines Foundry Co., Des Plaines,

Ill.; J. D. Coltman, Bullard Machine Tool Co., Bridgeport, Conn.; Horace R. Culling, Carondelet Foundry Co., St. Louis; Fred Erb, Erb-Joyce Foundry Co., Detroit; W. J. Grede, Liberty Foundry Co., Milwaukee; A. E. Hageboeck, Frank Foundries Corporation, Moline, Ill.; B. H. Johnson, Cresson-Morris Co., Philadelphia; Don McDaniel, Hamilton Foundry & Machine Co., Hamilton, Ohio; Walter L. Seelbach, Forest City-Walworth Run Foundries Co., Cleveland; Edward B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill.

The old officers were reelected at a directors' meeting following the annual meeting. They are: Walter L. Seelbach, president; B. H. Johnson, vice-president; A. E. Hageboeck, vice-president, and H. S. Chafee, treasurer. These with J. L. Carter will now serve as the executive committee.

At a meeting of the new board formal action was taken authorizing the appointment of a cost committee, research committee, merchandising committee, trade practice committee and committee on statistics. These committees will be named by the executive committee.

Previous to the annual meeting the old board of directors was addressed by Dr. Hugh P. Baker, Washington, manager of the Trade Association Department of the Chamber of Commerce of the United States, who explained the lines of development possible to trade associations under present Government agencies.

### New Alloy Casting Plant

Frederick L. Hewitt, formerly vice-president of the Hanson-VanWinkle-Manning Co., is chairman of the board of directors; John D. Scott, president; Claude L. Witter, president of the Provident Engineering Corporation, Philadelphia, vice-president; and Albert W. Gray, Hartford, Conn., treasurer and secretary of the Scott-Witter Steel Corporation, Hartford, Conn., a newly formed \$575,000 company to manufacture carbon and alloy steel castings at the former plant of the Connecticut Electric Steel Co., Flatbush Avenue, Hartford.



# "Bootleg Loans" Upset Forecasting

Credit Expansion, Outside of Banking Channels, Prevents Old Sequences, Says

Colonel Ayres Before Harvard Economic Society

**"L**OANS to others" (called "bootleg" loans by some commentators) have upset old rules of forecasting, according to Col. Leonard P. Ayres, vice-president Cleveland Trust Co., Cleveland, who addressed the Harvard Economic Society on "The Business Prospect" at the annual dinner of that organization at Boston, Nov. 17.

In the past short-term money rates were the best indicator of the immediate business trend. When interest rates became too high to carry stocks on a margin, stock prices went down. Such a signal came in February, 1928, he said, but since that time stock prices have risen to new heights. A reliable indicator went wrong.

Formerly, when interest rates were low, municipalities and corporations issued securities to finance construction work and improvements, and when interest rates rose, they stopped floating such issues. In 1928 it seemed as if these old sequences would operate according to precedent, he said. Issues of securities did, in fact, turn down sharply, but after a short dip rebounded, with especially large new issues in October and November. Another good rule had gone wrong.

Construction used to vary inversely with money rates. When they became high, there was a temporary downturn in building activity. But in October, construction turned up to a new record level.

For 50 years, almost without exception, bond prices rose so long as they yielded more than commercial paper. When interest increased sharply this year, bond prices went down, as they were expected to, but they then recovered and went up again. Another old precedent broken.

In the past commodity prices went up when short-term money rates went down, and vice-versa. But not so this year.

One reason for the failure of old rules to work is that in the past business men felt that when interest rates went up, credit was going to be not only expensive but decidedly scarce. A new distinction, therefore, must be drawn between a rise in the cost of credit and a possible stringency in credit.

While this new attitude toward interest rates is important, it is not, in Colonel Ayres's opinion, important enough to account for the unusual economic developments of the past year.

What we are now experiencing, in his view, is gold inflation after the gold is gone (1928 has seen a loss of

about a half billion dollars in our monetary gold, about one-ninth of our total supply).

The high rate of industrial activity, the record rate of construction, the advances in commodity prices and the unprecedented stock market have meant the use of a far greater volume of credit in 1928 than in 1927. The increase in credit has come through loans to brokers from firms and individuals rather than from banks. Such loans this year increased a billion and a half dollars without any decrease in bank reserves. In the main, they reflect a new policy of corporations, although some of this credit represented loans of firms, as well as foreign money.

## Corporation Cash Reserves Being Loaned on Call

Corporations, in the years of credit redundancy through which this country has passed, built up large cash reserves. These reserves are now being loaned for stock market speculation. The banks themselves are in part responsible for this development. Seeing the opportunity for commissions, they solicited the funds of corporations to put out on call. To overcome the conservatism of corporation treasurers they made such a strong case for the safety of call loans that in many instances companies not only put their spare funds out on call but withdrew virtually all their reserves from the banks for such use.

It is clear, said Colonel Ayres, that we have a new kind of credit instrumentality outside of the banking system, free from and beyond the control of the Federal Reserve system. Unchecked by any moral or legal restraints, it is possible that some time, but not now or soon, this form of credit will be regulated by legislation. It is also possible that there will some time be a reaction in the stock market that will chase out a large number of margin speculators. On the other hand, Colonel Ayres stated, this kind of loaning may continue until the country grows up to it and absorbs the credit in industry and trade.

While this supply of credit is not an inexhaustible reservoir, there is no way of telling how much more there is.

## No Definite Forecast of Business Possible

Colonel Ayres said that he and one of his colleagues had worked out a general forecaster on a basis of multiple correlation, using factors that had proved dependable for 30

years. This forecaster shows business rising until the middle of 1929 and then dipping sharply. While the situation may work out that way, Colonel Ayres is disinclined to commit himself, in view of the new unknown factor—"loans to others." He said that he would not attempt to make a definite forecast for 1929. The present momentum of business, he thought, would probably carry over into the second quarter, and might even carry through all of next year, depending on developments that cannot be foreseen.

## Purely Mechanical Forecaster Not Dependable

Another speaker at the dinner, Warren M. Persons, vice-president National Investors Corporation, New York, said that an accurate business forecast cannot be obtained from any mechanical medium. Moreover, business cycles do not come in one pattern, nor are they periodic. Some cycles are long, some are short.

## Prices Declining in Europe

**T**HIS country has been drawing gold from abroad since August, said Homer B. Vanderblue, Harvard Economic Society, at a session of the meeting on Saturday. This is causing pressure on credit and prices in Europe, as was the case in 1925. In fact, European commodity prices in the third quarter of this year declined, and there are indications that a similar trend is setting in in this country.

The stock market, according to Professor Vanderblue, is in a vulnerable position. When sentiment is all bullish, it can be quickly turned to the opposite view. So long as there is ample room for credit expansion (the Federal Reserve ratio is still relatively high), periods of readjustment will be transitory and temporary. A continuance of a selective stock market through 1929 seems likely. Building and instalment selling will probably be affected by tight money.

## Active First Quarter in Automobiles Forecast

**S**TOCKS of passenger automobiles in hands of dealers and at factories are subnormal, according to F. Leslie Hayford, economic statistician General Motors Corporation, New York, who spoke Friday evening, Nov. 16. This situation points to heavy automobile output in the first quarter, and probably the second quarter, of next year. A trend line prepared by Mr. Hayford indicates that in the past two years there has been a de-

ferment of buying amounting to 900,000 passenger cars. Production of such vehicles this year, at about 3,500,000, will be about 150,000 cars below the calculated normal. Estimated normal output in 1929 will be 3,800,000 passenger cars. Adding truck output, Canadian production, and exports, the total for next year should be 4,800,000 vehicles. Mr. Hayford, however, pointed out the shortcomings of mathematical calculation as a means of accurate forecasting.

#### Control of Production Influences Copper Market

**T**HE Copper Institute was formed a year ago, said F. E. Richter, economic statistician American Telephone & Telegraph Co., New York, and no one thought at that time that it would function so effectively so soon. While prices have not been directly controlled, no doubt exists that they have been indirectly influenced through control of production. A short-term correlation exists between curves of prices and refinery stocks. Stocks in this country in October were equal to less than one-third of a month's output. Refinery stocks in the Western Hemisphere are at the lowest levels since 1922.

The present year promises to usher in a new era in production replacing the one that began in 1895, in which this country consistently accounted for more than half of the world output. This year United States production will fall short of 50 per cent of the world total.

World production has gone up this year, but consumption has apparently risen proportionately. The course of prices next year, however, will depend to a considerable extent on the production policy of the Copper Institute.

#### Rationalization Aids Oil Industry

**T**WO outstanding features of the oil industry in 1928, according to J. E. Pogue, consulting engineer, New York, were:

1. Progress toward improved economic control through rationalization of production here and cartelization of the industry abroad.
2. Betterment in the statistical position and price of gasoline.

It became necessary early in 1928 to stem the flood of oil. This movement was initiated by producing companies and supported by States through commissions on conservation. As a result, production of oil was held at 2,400,000 bbl. a day early in the year and at 2,500,000 bbl. since August. This action permitted demand to catch up with supply.

A remunerative price for gasoline appeared in mid-year, and it is probable that gasoline would have advanced even if no element of artificial control of crude oil output had entered.

The stabilized crude oil market resulted in a slight advance in oil, but most of the profits of the industry came as a result of the operation of the law of supply and demand in

gasoline. The situation in gasoline was aided, but not determined, by crude oil curtailment.

In 1929 there is likely to be a strug-

gle between rationalization and potential oversupply. Crude oil output will probably increase despite the restraints imposed.

## Must Consider Buying Trends

### Dr. Julius Klein Emphasizes in Annual Report the Necessity for Making Adjustments to Modern Conditions

WASHINGTON, Nov. 20.—During the past decade the country has changed from a seller's to a buyer's market, Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, Department of Commerce, says in his annual report. Consumers are declared to be no longer willing to accept commodities simply because they are offered. Distributors, it is pointed out, are finding that many articles which once moved rapidly are no longer in demand and cannot be handled at a profit.

"The manufacturer or distributor who fails to take into account buying trends, commodity preferences and consumer habits is failing to make adjustments to modern conditions, and one of the major undertakings of the domestic commerce division of the bureau is concerned with a series of surveys designed to throw light on these obscure phases of domestic commercial technique. For the purpose of these surveys the country has been divided into nine areas whose boundaries have been fixed partly by differences in economic and business conditions and partly by administrative convenience."

The report discloses the comprehensive character of the trade promotional activities of the Department of Commerce, both in foreign and domestic fields. During the past fiscal year, the report shows, 800 firms and individuals voluntarily reported known sales and savings directly traceable to the bureau's activities totaling \$15,000,000, or an average of \$18,000 per firm. The bureau currently serves about 22,000 firms. On 3,000,000 occasions during the fiscal year, or nearly 10,000 each business day, it is pointed out, the bureau rendered some specific service to the American public.

In the face of the most vigorous competition, the report says, American exports of finished manufactures have steadily advanced until last year they reached the total of \$2,061,000,000, an increase of 4 per cent over the previous year and fully 70 per cent over 1921-22. Of the output of American plants, 8 or 9 per cent is exported, it is stated, representing the production of not far from 1,000,000 industrial workers. Not including clerks and other salaried workers, the report says, there are employed 75,000 workers to produce the machinery exported; 24,000 to manufacture the iron and steel that goes to world markets; 47,000 to turn out automobiles and parts for overseas

buyers and 5500 in tool and cutlery works.

#### Statistical Standardization Needed

Listing problems facing American business, Dr. Klein mentions the need of simplification in the terms and phrases in which trade is conducted and of standardization of statistical methods. The movement for industrial combinations in the form of international cartels, Dr. Klein points out, has attracted a good deal of attention during the past few years and is likely to exercise considerable influence on American economic relations with foreign countries. A preliminary study of the subject has been undertaken by the bureau and it is believed by Dr. Klein that the importance of the movement would justify a wider investigation. There is need also, he says, for the bureau to further the effort of American industry to take speedy and effective action to protect itself against loss of good will in established and potential markets from effects of piracy of trademarks, misleading imitation and other means of "passing off" spurious merchandise.

Broader analytical studies which the bureau has made of the finances of foreign countries and which have proved of usefulness to American investors are urged, as well as studies concerning various problems surrounding the establishing of sales and distribution organizations in new areas abroad by American manufacturers. It is also declared that the adoption of uniform codes of customs regulations and port procedure would do much to lessen the perplexities of exporting. Producers and distributors, it is declared, feel that, if further study could be made within the department, and selected trade associations could be approached on the possibility of developing a system of certification by the trade association concerned that exported goods are in accord with given specifications, recognition of this certificate by customs authorities in foreign countries might then be sought.

Discussing the study undertaken of industrial equipment to give factory owners a clearer idea of losses suffered through the use of partially obsolete machinery, Dr. Klein says the worrisome question of when to scrap a machine and the proper methods of accounting for obsolescence as distinguished from depreciation cannot be solved until a better factual basis has been established.



# Describe Progress in Sheet Rolling

Mechanical Engineers Also Discuss Other Iron and Steel Matters  
at Meeting in Chicago Last Week

**M**ECHANICAL engineering matters in the iron and steel field were made the subject of a meeting last week in Chicago. The topics included heat economy progress in steel mills, sheet rolling, making nickel steel plate, depreciation and obsolescence, non-ferrous bearing metals, steel mill lubrication, hot blast cupolas and the position of the German iron and steel industry. The meeting was held under the direction of the iron and steel division of the American Society of Mechanical Engineers and under the auspices of the Chicago section of the society. The technical sessions took place at the Palmer House, Chicago, on Nov. 14 and 15, and simultaneous visits were arranged on the afternoon of Nov. 15 to the Gary Works and the South Chicago Works of the Illinois Steel Co., the Inland Steel Co. and the Acme Steel Co. The attendance was close to 200, many representing the Chicago district.

Those particularly responsible for the meeting, which served to typify the plans of the new division of the society to devote itself to iron and steel mechanical engineering, were George T. Snyder, chief engineer National Tube Co., Lorain, Ohio, and chairman of the division; Rogers A. Fiske, Western editor THE IRON AGE and chairman of the technical program, and P. T. Wetter of the staff of the society.

The technical contributions were presented at three day sessions and at a dinner on Wednesday evening. The presiding officers were John W. Shepherdson, chief engineer Morgan Construction Co., Worcester, Mass.; J. Fred Mowat, chief engineer, Joliet Works, Illinois Steel Co., Joliet, Ill.; A. J. Boynton, vice-president H. A. Brassert & Co., consulting engineers, Chicago, and Senator James E. MacMurray, chairman Acme Steel Co., Chicago, who officiated at the dinner. Owing to the limits of space, only the part of the report of the meeting that covers sheet rolling can be given in this issue, leaving the various other topics for subsequent numbers.

## Pays Tribute to Sheet Steel Industry

**S**HEET rolling elicited several written discussions. The paper on the subject was an adverse criticism, by Leon Cammen of the staff of the society, of existing practice in this country and abroad. "An analysis of its present development," said he, "would give it [industry] a mentality of 12 years as applied to steel and probably around eight or nine years as applied to copper and brass." He termed the wide

strip mill as more or less a speculation, that "as it is the finishing of the sheet that constitutes the major part of the cost, it is perfectly possible that a new method of operation will be developed and that the wide strip mill will become obsolete before it [has] had a chance to pay for itself."

Mr. Shepherdson, chairman of the session, disagreed with the author's designation of the mentality equivalent of the sheet rolling industry. He is convinced, he added, that the hot rolling of thin gages in wide widths has been a problem and continues to be a problem to tax the wisest and most experienced rolling mill men. Any method of manufacturing a product, he continued, has its limitations. "For instance, the Garrett type of rod mill is limited to a small rod bundle around 180 lb. Any rod mill is ill adapted except under unusual circumstances to roll smaller than No. 5 rod. Beyond that point it is generally cheaper to cold draw.

"In the days of three-high sheet-bar mills, sheet bar was regarded the lightest section suitable for rolling on such mills. The continuous sheet bar mill installed at the plant of the Youngstown Sheet & Tube Co. some 23 years ago merely rolled this product for the first time from a whole 6500-lb. bloom direct from the ingot heat and fitted into the scheme of the then prevailing and, for that matter, now prevailing system of sheet rolling.

## Finishing in Continuous Sheet Mill

"The transition now in course of evolution is to carry a semi-finished intermediate product down to lighter gages, at higher speeds, but up to the present no attempt is being made to do this from the initial heat of the ingot or in weight of slab corresponding to the whole ingot. The difficulties are well recognized: speed, high tonnage per minute, heavy torques mean power, and power beyond all previous concentration is being put into small rolls. New metal in the rolls is required of sufficient endurance to withstand the localized surface pressures. These new rolls could not come overnight. The American sheet mill industry, far from showing temerity, has plunged into a new process pretty much regardless of cost, allured by the potential advantages in sight. This was no twelve year old boy's job."

Daniel Eppelsheimer, vice-president American Rolling Mill Co., Middletown, Ohio, pointed out that in discussing the economic importance of the new process of rolling mention

should be made of the developments in the finishing department that must be followed. "It must be evident," said he, "that new and advanced modes of pickling, annealing, cold rolling and coating are of necessity employed in order to gain full benefit from the higher production of the continuous rolling."

He emphasized that the control of the shape of the rolls in successive stands of a tandem or continuous mill involves much more than the original turning of the rolls and heating of them by the piece. The shape between the rolls when the piece is being engaged is the critical thing and it must be appreciated that this is affected by a large number of factors ranging all the way from the rigidity of the mill housings to the character of lubrication of the roll necks or bearings.

"There are a number of problems other than those mentioned in the paper," added Mr. Eppelsheimer, "which required solution in order to substitute mechanical operation for the high degree of skill required by the hand rollers of the past. I believe that a full understanding of them would convince the members of this society that Mr. Cammen has underestimated the difficulty of replacing the particular manual operations involved by a series of mechanical devices."

He went on to say that in the Ashland process the shape of the rolls when in engagement with the piece is deformed from the truly cylindrical and the shape in each stand is less deformed than the preceding one. This process of rolling wide, thin metal, he added, is used not only at Ashland, but at Butler, Pa., and Middletown and by licensees of the American Rolling Mill Co. at Weirton and will be used shortly at Wheeling. It has, he suggested, a much wider application than the author of the paper apprehends.

"Those members of this society who visited Ashland," he continued, "will recall that the continuous pack rolling units of the mill installation are planned to operate in parallel with each other, as well as in series with the continuous roughing mill, and I may add that our experience indicates that it is fully practical to provide continuous or tandem finishing mills, operating always according to the deformation process, noted by the writer, for reducing sheet metal to any desired gage with large attendant economies."

The patent situation was discussed by the author, who said continuous sheet rolling, not a new art at all, is literally plastered with patents. Mr.

Eppelsheimer in referring to the subject said: "I have had personal connection with the development of the patent situation of the American Rolling Mill Co. and have attempted to keep informed on the patent situation in general. To my mind there is no basis for a fear that rival concerns are on the way to, or are even unconsciously drifting into, the position of interfering with each other by means of trivial patents. The entire situation was, as I believe, so completely worked out by the American Rolling Mill Co. before the industry became convinced of the practical importance thereof that there is but little room so far as this development is concerned for the automobile or radio situation to be repeated."

#### Increased Output of Conventional Mills

R. J. Wean, vice-president Aetna-Standard Engineering Co., Youngstown, Ohio, said it would be well to give due credit to the accomplishments of those engaged in this great industry, whose total output this year will approach 5,000,000 tons, having an approximate sales value of \$300,000,000 to \$400,000,000. "When it is realized that the sheet and tin plate industry has invested upward of \$75,000,000 in the last two years for the production of tin plate and sheets by new methods and processes, they cannot, in all fairness, be accused of a total lack of progressiveness."

"While it is true that for many years this industry was slow to take up new developments, it must be remembered that this was during a period when profits were ample to satisfy the stockholders and the pressure of low selling prices was not present. In recent years this industry has made tremendous strides in the improvement of the quality of their product, as well as increased production from existing equipment. For many years the sheet industry was largely in the hands of mill men—men who had been trained to roll steel by actual experience. Very little engineering knowledge was applied to the industry as a whole, and this possibly accounts in some measure for their lack of progress, as in recent years the developments that have come into the sheet industry have been brought about by applying engineering effort."

"Strange as it may seem, the introduction and development of wide strip rolling, when used for tin mill breakdown purposes, caused the development of new methods of heating, as well as new methods of finishing this material, that can be applied to any existing conventional type sheet or tin mill. Continuous pack heating furnaces and mechanical catchers for the mills constitute largely these improvements at the present time, and this permits an increased output per mill with a reduced mill crew."

"In past years on full finished or automobile sheets," continued Mr. Wean, "it was general practice for the bars to be roughed down from two to four passes on the roughing

mill and then swung to the finishing mill, where they would be given several additional roughing passes before matching. The pack would then be returned to a sheet furnace for reheating and subsequently finished on the finishing mill."

"When operating in this manner, one crew would operate both the roughing and finishing stands. The result would be that either one of the mills would be idle 30 or 40 per cent of the time and, in many cases, even more. During the past year, what is known as the 'double mill' or 'Tipperary' system has come into quite prominent use, which means that the roughing mills are operated by one crew and the finishing mills by another crew, so that all mills are being operated as nearly 100 per cent of the time as heating and mill conditions will permit."

"To the writer's knowledge as much as 25 to 30 tons of 19-gage sheets 36 in. wide, 78 in. long, rolled three in a pack, were finished on a sheet mill of the above type in 8 hr. When this is compared to the old style production of 9 to 12 tons in 8 hr., it can readily be appreciated what this will mean to the sheet producer in the form of reduced cost, as well as increased tonnage, without the addition of any actual rolling equipment. When all of the economies of this nature have been accomplished in what we will term the conventional type sheet mill, it will be extremely difficult for wide strip steel producers to manufacture at a lower cost than the ordinary sheet mill producers."

"The actual cost today for erecting an 8-stand sheet mill would be approximately \$1,500,000 to \$2,000,000, which represents about \$250,000 per hot mill. This, of course, would include buildings, furnaces and other machinery, without which it would be impossible to operate the mill."

#### Makes Long, Thin Strips Without Reheating

Lloyd Jones, E. W. Bliss Co., Salem, Ohio, said he could not agree that the wide strip mills have proved a failure. Of the last three wide strip mills to be put in operation, two of them exceeded expectations in thinness of gage and the third is producing within the limits of gage. "It is true that, under the present hot strip practice, No. 12 to No. 16 gage may be considered commercial limits in wide widths, but with the addition of cold rolling these strips can be reduced to any gage desired."

Mr. Jones's idea of the sheet mill of the future is in part as follows: A tandem roughing section and a continuous finishing section. The product of this mill may range from 12 to 36 or 42 in. in width, about 250 ft. in length and from No. 3 maximum to No. 26 minimum in gage. The mill would cover jobbing mill plates and sheets within the width capacity in all gages, sheet mill products within the width capacity and all gages down to No. 26-gage—or probably 75 per cent of the sheet tonnage. As to tin

mill products, the mill would cover No. 18 to No. 22-gage material, which could be doubled and hot rolled on hand mills to light gages. An alternative to this would be cold rolling on cluster or backed-up mills to the desired gage. In conclusion he said: "We have produced hot strips of long length No. 24 gage thick from a hot slab in one rolling without reheating, by a process recently developed."

#### Marked Improvements in Conventional Rolling

As a part of his contribution to the discussion, H. L. Bodwell, assistant district manager, American Sheet & Tin Plate Co., Vandergrift, Pa., gave a brief description of the present method of rolling light gage sheets to assist in visualizing some of the difficulties involved and to point out the improvements made to improve quality and quantity.

"The size of the rolls," he said, "has increased from 18 or 20 in. in diameter to 30 or 32 in., with corresponding increases in the size and strength of the housings and drives. Methods of heat control of the rolls have been perfected so that variations in temperatures are held within 50 deg. Fahr. in all stages of the rolling operation, with consequent longer life of rolls. Roll breakage is now a rare occurrence and it is usual to obtain a life of roll of 100 days or more before it has to be discarded on account of the entire chill being removed."

"Preheating of rolls is practiced, eliminating the necessity for making a large amount of more or less unsalable warming-up sizes and permitting the immediate rolling of orders, with consequent better deliveries."

"Continuous pair furnaces are used, with less labor in charging and elimination of puddling and with improved quality of pair heating. Mechanical doublers have been introduced, doing away with one of the most difficult jobs. Various mechanical means of handling bars and handling packs into sheet furnaces and at mills have been devised. Working conditions have been improved by installation of water cooled floors, ventilating systems and forced air cooling systems. On the whole, many improvements have been made and the output per mill has been doubled in the last 25 years."

"The standard mill unit consists of a roughing mill, sometimes called the soft mill, with both top and bottom rolls driven, a finishing mill with only the bottom roll driven, the top roll being driven by friction, and the necessary complement of pair and sheet furnaces, shears, doublers, etc."

"The roughing rolls may be steel or gray iron, but usually wornout finishing rolls are utilized. They are kept cold by means of a spray of water. The finishing rolls are of cast iron, with about  $\frac{3}{4}$  in. chill, 28 in., 30 in. or 32 in. in diameter, of a length suitable for the ranges in widths to be rolled, varying from 34 in. in length of barrel to 84 in., and



weighing from 8000 to 25,000 lb. They are run hot but kept below about 750 deg. Fahr. by means of steam or air blowers.

"The crew consists of the roller, who is the foreman of the crew and has general charge of all operations on his mill, and these other members: Sheet heater, roller's helper, heater's helper, rougher, catcher, pair heater, pair heater's helper, matcher, doubler, shearman, leader and opener. Additional help is provided as required by reason of excessive weight of bars or other causes.

"The bars are drawn from the pair furnace in pairs and broken down on the soft mill until approximately  $\frac{1}{4}$  in. thick. Then they are swung over to the finishing mill, where the roughing is finished, the rougher and catcher doing this work. The two pieces are matched together for length and thickness and the roughing finished in that way.

"After the roughing, the breakdowns are matched and doubled and reheated in the sheet furnace. After

reheating, if 28 or 30 gage, the pack is run over on the finishing mill one pass, then opened, matched and doubled again. The pack now consists of eight sheets and is reheated again in the sheet furnace and finished by the roller in as many passes as necessary to obtain the required length. No. 26 gage is matched in 3's after roughing and doubled into packs of six, then reheated and finished.

Other gages may be rolled either single or double, in 2's, 3's or 4's as may best suit the particular gage and size being rolled. The bars are generally worked in heats of 12 pairs each. Both bars and packs are, at some stage of the process, worked below the critical temperature. As the greater part of the roughing, the run-over and the finishing are done on the one finishing mill, those members of the crew performing each part have ample time to rest. The hot finishing rolls are kept almost constantly in use and are, therefore, kept at a uniform temperature."

Melting speed depends upon the physical character of the charge and the analysis of the steel to be made. Heats already made in the furnace have demonstrated that under ordinary conditions, 600 lb. of steel or base metals (Swedish pig iron and muck bar) can be melted in 50 to 55 min. The container for the metal is a monolithic crucible or a lining tamped in around a core, and acid, basic or neutral refractories may be used. Experiments have disclosed a life of crucibles of 45 heats, but this record may be materially bettered, it is believed, with more constant use.

Advantages claimed for the new method of melting over others are that the stirring motion in the bath causes complete dissemination of the alloys; that, because the heat comes from induction, there is uniform distribution of the temperature throughout the bath; that the steel is made in the absence of oxygen, and of phosphorus and sulphur from fuels; that there is no contact with carbon electrodes, and that the consistent chemical results indicate that the furnace provides a most delicate control over all of the elements contained in the steel.

The furnaces are housed in a new building of brick and steel, called the electric furnace department. It is remarkable for its roominess, lighting and ventilation. Along the wall, opposite to the side on which are located the electric furnaces, are bins for holding the raw materials, and the entire plant is served by a 5-ton overhead electric traveling crane.

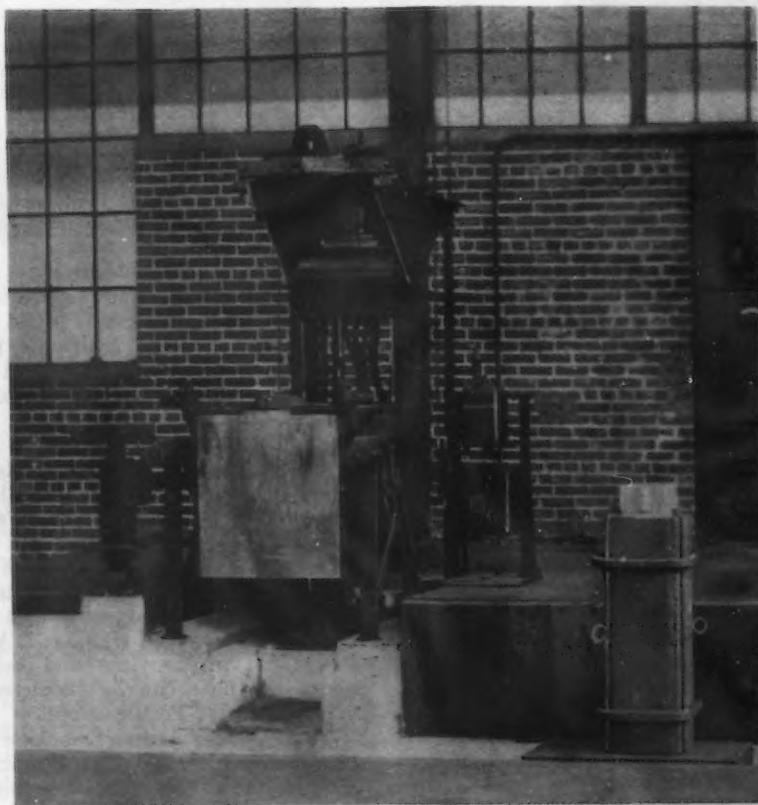
## Rapid Melting of High-Grade Steel

### High-Frequency Electric Induction Furnace at Pittsburgh Melts 600 Pounds in About an Hour

**A** DEMONSTRATION of a new 600-lb Ajax-Northrup high-frequency induction steel melting furnace, recently placed in operation at the plant of the Heppenstall Forge & Knife Co., Pittsburgh, was held at the plant of that company Friday afternoon, Nov. 16. It attracted some 300 members of the Engineers Society of Western Pennsylvania and the American Society for Steel Treating and others interested in the manufacture of high-grade steel. The visitors saw steel made by a process that is believed to be the first installation of its type in the country to cast steel ingots for production work. In a little more than an hour a charge of cold metal was melted and poured, and neither the melter nor those who stood close to the furnace experienced discomfort because of the temperature of 3000 deg. Fahr. of the molten metal. The shell of the furnace could be touched without danger of burning at any time during the operation, and the radiation of heat is evidently not great even during the periods when the cover of the pot is opened to receive alloy additions.

The high-frequency current is supplied by a 150-kva. motor-generator set, in which the current is transformed from 60 cycles to 960 cycles. This current is passed through a helical copper coil, which surrounds the container of the metal charge. Electromagnetic currents are set up and heating and melting ensue. Because there is no contact between the coil and the charge, induction melting often is referred to as "melting by radio or wireless." The furnace is

the product of the Ajax Electrothermic Corporation, Trenton, N. J.



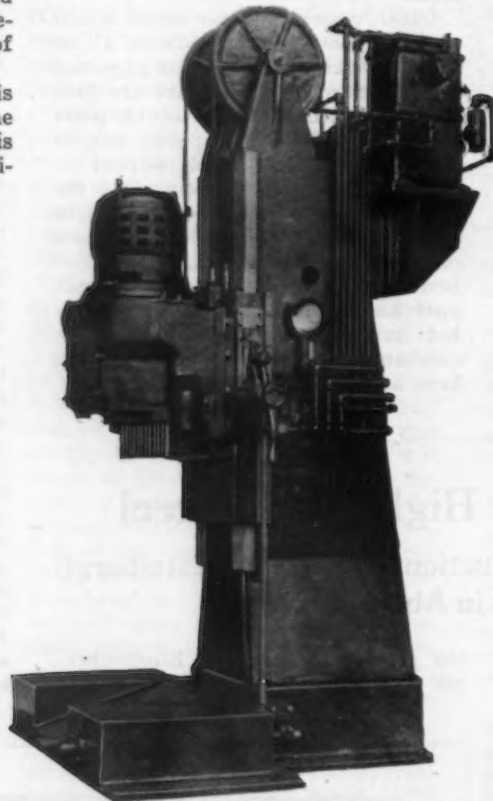
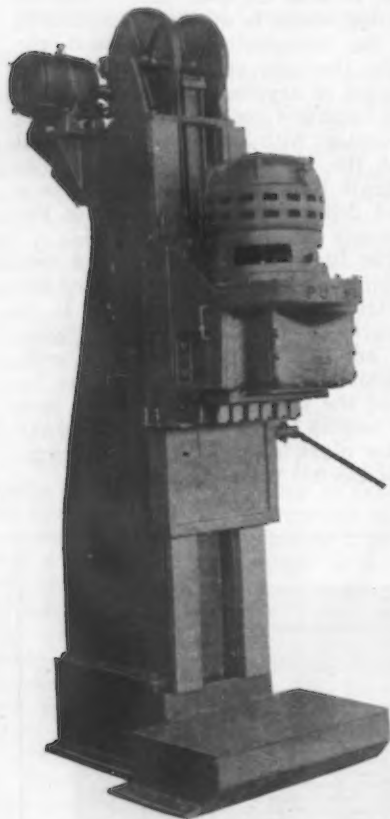
Pouring Side of a 600-Lb. Ajax-Northrup High-Frequency Furnace

## Boring and Drilling Machines for Automotive Use

**D**IRECT motor drive of the spindles and plate mounting of the spindle bearings in the head are outstanding features of a cylinder boring machine and a valve hole drilling and reaming machine—both of vertical type—which have been brought out by the Shaw Crane-Putnam Machine Co., subsidiary of Manning, Maxwell & Moore, Inc., 100 East Forty-second Street, New York. Except for details of the head, the machines are of the same general design.

In both machines the motor is mounted on the head, close to the tools as shown, and the drive is through chrome-vanadium steel heli-

automatic and manual control is employed. With the automatic feed the head rapidly approaches the work, goes into feed and continues at the predetermined feed until the work has been bored or drilled; it then returns rapidly to the upper position and stops. When the work is changed,



*THE Cylinder Boring Machine Is at the Left and the Valve Hole Drilling and Reaming Machine Is Above. The separate plate arrangement of the Timken bearings, which permits changing center distances of spindles by installing new plates and gears in the head, is shown at the right*

cal gears. All shafts are mounted in Timken roller bearings and flood lubrication is provided by a geared pump.

Separate plate mounting of the Timken bearings permits changing the center-to-center distances of the spindles by installing new plates and spindle gears in the head, which arrangement is emphasized as eliminating the necessity of applying an entirely new head for various spindle groupings. The outer bearing cups are pressed into the steel plate and the inner cones of the roller bearings are machined directly on the shafts, which are heat treated. Use of these steel plates and the special application of the Timken bearings provides space for unusually large diameter spindles, thus affording strength for maximum speed of operation. The spindles, held rigidly, are practically vibrationless.

Oilgear hydraulic feed with both

this cycle of automatic operation is again started by means of a convenient lever. The hydraulic pump with its 3-hp. motor is mounted on a bracket on top of the column of the machine, which construction minimizes floor space requirements.

The saddle has a narrow guide and taper gibs are provided at both top and bottom to assure accurate alignment. The table and base on both types of machines is made in one casting and the upright is bolted to the base and fitted with key and dowels to assure rigidity. Work tables of various sizes and heights above the floor can be furnished to suit particular requirements.

The cylinder boring machine can be arranged for 4, 6 or 8 spindles. The distance from the center of the tool spindle to the column face of the machine shown is 14½ in., the distance from the spindle ends to the top of the work table may be

from 31 to 79 in. The work table is 25 x 48 in. and is located 12½ in. above the floor. The spindles of this machine are driven by a 20-hp. constant-speed motor which is controlled by push buttons.

The valve hole drilling machine can have 6, 8, 12 or 16 spindles. The distance from the center of the tool spindle to the column face is 13 in., and the distance between the top of the table and the ends of the spindle may be from 32 to 58 in. The work table, located 10½ in. above the floor, measures 27 x 56 in. A 5-hp. constant-speed motor with push button control is used on this machine.

## Machine Knife Makers Are Merged

The A. A. Simonds Co., Dayton, Ohio; the L. & I. J. White Co., Buffalo; the R. J. Dowd Knife Works, Beloit, Wis., and the Worden Tool Co., Cleveland, leading manufacturers of machine knives, have been merged under the name of the Simonds-Worden-White Co. For the present the four plants will be operated as separate units, with general headquarters at



Dayton, Ohio. W. E. Bonesteel, who was president-treasurer of the Worden Tool Co., becomes chairman of the board of the new organization and will maintain his office in Cleveland. Herbert R. Simonds is president of the new company and Frank R. Henry is secretary and manager of sales. Both were affiliated with the Simonds company. W. S. Wall of the White company is first vice-president. In addition to the manufacture of machine knives the White company makes edge tools, carpenter tools and saws, and the Simonds company manufactures emery wheels.

Cold Metal Process Co., manufacturer of light gage strip, or shim steel, has moved to larger quarters in the old plant of the Youngstown Boiler & Tank Co., Glenwood and Mahoning Avenues, Youngstown. Beside rolling shim steel, the company has begun to make stampings.



## Accuracy of Tools and Work Checked Rapidly

**A**N amplifying comparator with diamond measuring point and a dial having 0.0001-in. graduations spaced 3/16 in. apart, to facilitate reading, has been placed on the market by the B. C. Ames Co., Waltham, Mass. The instrument is sensitive, accurate and impersonal, and is in-



*Variations of 0.0001 In. Are Amplified to Nearly 3/16 In. In the above set up pistons are being tested to 0.0005-in. limits*

tended for use in maintaining size control both on work in process and the tools employed. It will accommodate work up to 8 in. under the measuring point.

The instrument is simple to use. A standard size block, or unit, is placed on the platen under the measuring point and the dial is adjusted so that the pointer comes to rest at zero. After the block is moved away, it is returned a few times to make sure of the adjustment. In testing the work, movement of the dial pointer to one side of zero indicates a minus dimension and to the other side a plus dimension. Ability to repeat readings is an outstanding characteristic claimed, and the most delicate setting can be quickly and securely locked in place. Rigid construction prevents errors due to spring of the instrument.

The micrometer dial gage is of fan shape. Its entire range shows only 0.001 in. plus and 0.001 in. minus, and occupies a sweep of nearly 4 in. The amplification thus secured is emphasized as relieving eye strain, and permits the operator to read down to 0.000025 in. easily and precisely. The minus graduations, at the left of zero, are in red, and those at the right of zero, the plus readings, are in black.

The iron base is heavy, has three-point support and three rubber feet. The column is of solid steel and is bolted against a wide shoulder. The bracket which holds the indicator is of massive design, ribbed and clamps to the column positively. It is ad-

justable up and down for coarse setting by means of rack and pinion. The head cannot drop and injure the indicator when the binding clamp is loose. A special feature is the lever inclosed in the bracket. This lever serves to hold the indicator contact point and absorb all horizontal stress and strain, thus causing dial readings to repeat positively. It does not affect amplification, the latter being obtained directly from the measuring point through the 0.0001-in. dial gage.

A stop bracket, consisting of a casting and a hardened tool steel stop blade, is adjustable to accommodate

the work in testing position. Stops are provided on the bracket lever to protect the indicator from being jammed or injured.

The platen, of tool steel, hardened, ground and lapped flat, is 5 in. long, 4 in. wide and 1 in. thick, and is movable to prevent local wear. It is mounted on a large adjustable spindle, fitted with a clamp, and is raised and lowered by a knurled screw through worm and gear. Platens of special shape, and V-blocks, can be furnished. The diamond in the measuring point is rounded and will not scratch or mark the work. The height of the amplifying comparator is 16 in. and the weight 70 lb.

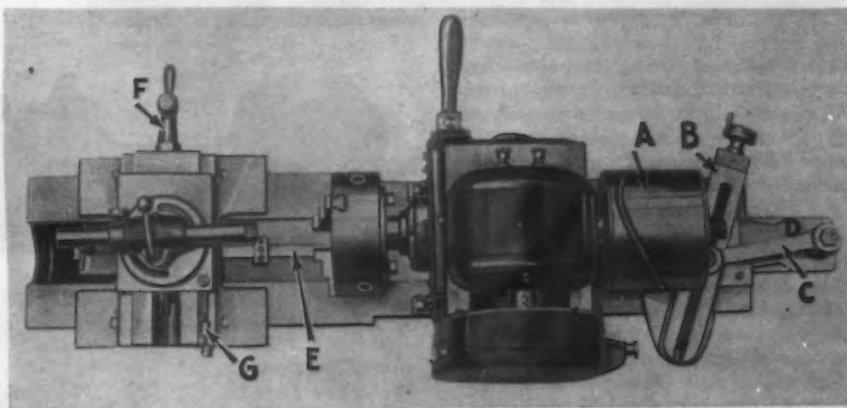
## Oil Grooving Machine of Simple Design

**S**IMPLICITY of design and convenience of operation are features of a self-contained ball-bearing oil groover which has been placed on the market by the Watson Brothers Machine Co., Inc., Bound Brook, N. J. Three sizes can be furnished, one smaller and one larger than the particular machine illustrated, which is for grooving bushings from 3/4 to 6 in. in diameter and up to 6 in. in length. It will also cut barrel cams and score bushings and inserts with endless threads for die castings. Taper attachment can be supplied and the machine can be furnished without legs for bench mounting.

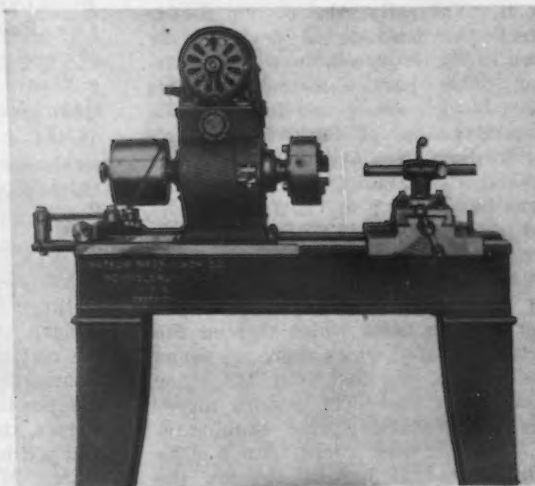
Bushings to be grooved are held in a 6-in. universal chuck or in an air chuck, the spindle of the machine be-

ing hollow and threaded on one end to permit attaching the air chuck. The grooving tool is mounted in a swivel toolpost on a cross-slide on the carriage. Grooves are reproduced by cams, two of which, one single and one double, are furnished. The cam has a clutch within it which provides a double index for grooving on the opposite side of the bearing. By disengaging the carriage and rotating the spindle any number of grooves in a plane perpendicular to the axis can be cut.

The forming cam A, mounted on the rear end of the spindle, gives longitudinal movement to the cutting tool and carriage through a follower, stroke adjustment arm B, connecting link C, slide D and connecting rod E.



*Oil Grooves Are Reproduced by Cams, Two of Which Are Furnished. Barrel cams can be cut and bushings and inserts scored with endless threads for die castings. The component parts and action of the machine are shown in view above*



The stroke may be adjusted from 0 to 6 in. by the small handwheel on the end of arm *B*. Depth of cut is controlled by the cross feed handle *F*, a depth adjustment and stop being provided at *G*. The spindle and cam are driven by a ¼-hp. motor through spur gears, worm and worm wheel. Control of the motor is by means of a switch at the front of the machine. Spindle speeds of 60, 80 and 120 r.p.m. are obtained by change gears.

To make the machine ready for operation, all that is necessary is a simple adjustment of the stroke arm, depending on the length of the bushing and the setting of the tool. When changing work in the chuck the spindle is disengaged by means of a clutch.

The machine occupies floor space of 20 x 60 in. and the height to the center of the spindle is 41½ in. The net weight is 500 lb.

## Three-Block Wire-Drawing Frame

### Safety Features and a Slip-Clutch Used on New Machine for Production of Drawn Wire

BY JOHN NELSON

**T**WO devices feature a three-block rod-frame designed and built by the Washburn shops of the Worcester Polytechnic Institute, Worcester, Mass., for the Atlantic Wire Works, Branford, Conn. The essential feature of the machine is the use of a slip-clutch designed by the Washburn

proper degree of acceleration and removes the chance of snapping the wire.

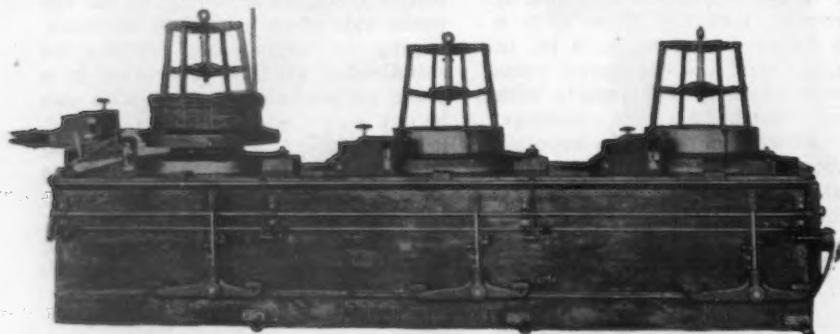
Provision is made for quick overcoming of momentum and bringing the block to rest when power is shut off, by means of a self-energizing brakeshoe operated by a lever, the

power the lever returns to idle position, the fingers automatically lock it in place.

Drive of the block spindle is through cast steel gears of the herringbone type. Different speeds may be obtained by changing these gears, or the machine might be built with change-gears that would permit drawing several sizes of wire at the will of the operator, without alteration of the mechanism.

Three horizontal rods seen extending along the front of the bed constitute the means of automatic operation of the electrical device for stopping the machine. Pressure against the uppermost rod, such as would happen were an operator's body to be thrown or to sag against it, operates the drum-switch which shuts off the power. Pulling forward the lower rod starts the motor operating again.

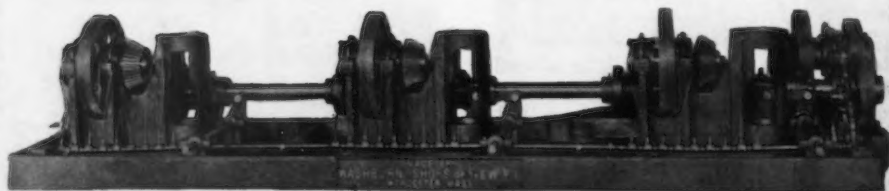
Ball-bearings are used throughout, with positive circulating lubrication. Driven by a Westinghouse line-start motor of 40 hp., the machine is about 15 ft. long and weighs close to 11 tons.



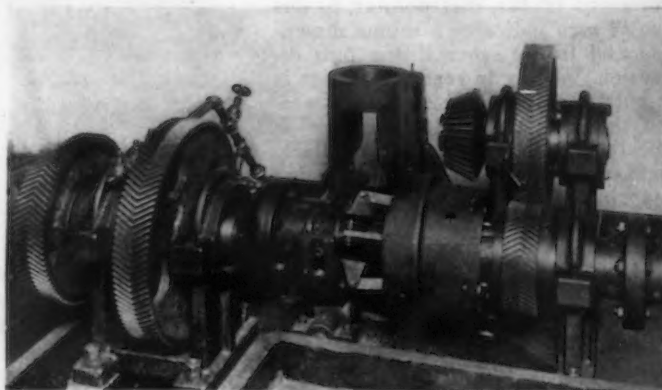
shops for wire-drawing purposes. Another important feature is the provision made to guard against injury to the operator. The motor may be stopped by pressing a button, or mechanically through a rod that extends along the front of the bed, and acts to shut off the power, should a man's body fall against it.

The friction clutch is designed to do away with starting strain and possible snapping of the wire. The clutch operates somewhat after the manner of the automobile clutch. It is highly sensitive and, if desired, may be started at a speed even as low as 2 r.p.m. Naturally, the 60 r.p.m. for which the machine is designed, or even a higher speed, is wholly feasible. This particular machine has three blocks, one a two-decker which permits passes of the wire through the medium of a sheave pulley.

Vertical starting levers for the three blocks, seen at the front of the bed, are attached at their lower ends to a shaft which operates fingers that act to slide a sleeve on the main driving shaft. The motion of the sleeve operates the cams which tighten the friction disks, of which there are seven sets of two, one cast iron, the other bronze. An unskillful, sudden movement of the starting lever would start up the block with a jerk. But a sufficiently gradual motion insures the



**T**HREE-Block Machine, Showing at Upper Left the Two-Story Block Designed for Passing Wire Around a Sheave. The other views are of the driving mechanism and the lubricating system



device resembling those used in controlling talking-machine disks.

Each vertical lever which operates the clutch has a safety device which insures that it will remain in its neutral position. It is held between two fingers, the left one of which must be snapped back before the lever may be moved. When with the shutting off of

### Reducing Varieties of Welded Chain

WASHINGTON, Nov. 19.—Approval of a simplified practice recommendation for welded chain was given at a general conference of manufacturers, distributors and users at a meeting held at the Department of Commerce under the auspices of the division of simplified practice last week. The program will become effective for new production on Feb. 1, 1929, while the distributors will have until May 1,

1929, to use up present stocks. R. L. Lockwood of the division, who represented the department at the conference, pointed out that, after a careful study and survey of production and demand covering all regularly catalogued items, it was found that two-thirds of such items would amply satisfy all normal demand.



## Two-Ton Hydraulic Broaching Press

A NEW 2-ton hydraulic press with maximum stroke of  $14\frac{1}{2}$  in., for broaching, assembling, arbor pressing and other operations, has been brought out by the American Broach & Machine Co., Ann Arbor, Mich. The machine is self-contained and can be furnished either for belt or motor drive.

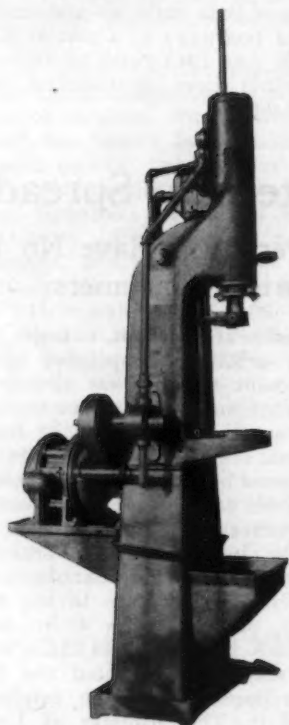
The ram, which is 2 in. in diameter and is tapped at the end to receive

For motor drive a 2-hp. 1800-r.p.m. motor is recommended. Lubricating pump and lubricant receptacle can be furnished. The machine is available for bench mounting as well as with the pedestal, the former weighing 580 lb. and the latter 800 lb.

### Motor-Driven Mechanism for Operating Valves

A MOTOR-DRIVEN valve-operating unit is being put out by the Cutler-Hammer Mfg. Co., Milwaukee, which makes possible automatic operation of all valves up to 6 in. Although so small that it can be held in one hand, this unit has a rating of 15 lb.-ft. It can be actuated automatically by float switches, temperature controlling devices, pressure regulators, etc., or by push buttons.

This unit is similar in principle to the standard C-H "Dean" operating unit. While designed primarily for valve-operating service in industries where regulation of pressures and temperatures of gases and fluids is

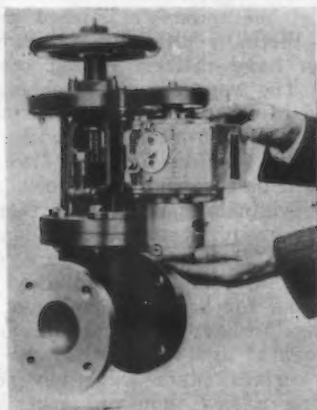


Work Up to  $10\frac{1}{4}$  In. in Diameter Can Be Handled on the Table. The stroke of the ram is adjustable up to  $14\frac{1}{2}$  in.

attachments for pushing, has a speed of 14 ft. per min. The stroke is adjustable up to the maximum,  $14\frac{1}{2}$  in. The work table has a  $2\frac{1}{4}$ -in. hole central with the ram and at the front has a notch which can be cut through, if desired, to facilitate removing assembled parts. The finished working surface of the table is 8 in. in diameter and the offset in the frame of the machine permits handling of work up to  $10\frac{1}{4}$  in. in diameter.

Control of the machine is either by hand lever or foot pedal and the arrangement is such that upon release of either lever the ram returns automatically to the upper, or starting position.

A 5-gal. oil reservoir is contained in the base of the machine. The pump is of continuous-flow type and control of the action of the ram is by means of a balanced piston valve. The hydraulic cylinder is 4 in. in diameter and is of gray iron; the piston is of conventional type using step joint rings and one leather cup. Oil is delivered to the full area of the piston on its downward stroke and to the lower end of the cylinder on the return stroke. The up-stroke of the ram is 25 per cent faster than the down-stroke.

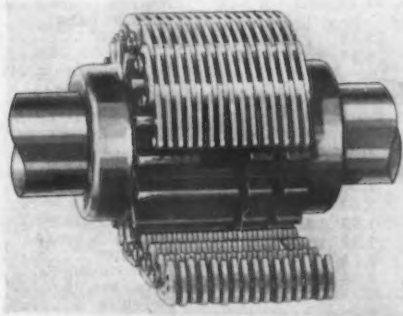


Valve Mechanism Designed for a Wide Variety of Services

necessary, it is likewise adaptable to many miscellaneous applications, such as operating skylights, awnings, radiators, doors, etc.

### New Flexible Coupling

A NEW flexible coupling brought out by the Morse Chain Co., Ithaca, N. Y., consists primarily of a



Efficiency, Durability and Simplicity Are Claimed for This Coupling

Morse chain wrapping two sprockets, each one-half the width of chain. One sprocket has a guide groove in center of face to hold the chain in place; the other has no guide groove and is free to float under the chain. The chain fits loosely enough on the sprockets to take care of ordinary misalignment and lack of parallelism. High efficiency, durability and simplicity are claimed for this coupling.

### Welding Set for Direct Current Circuits

A 200-AMP. welding set containing many new features in design and construction has been placed on the market by the Westinghouse Electric



Starting Rheostat, with Low-Voltage Protection, Is in Cabinet on Top

& Mfg. Co., East Pittsburgh. It has particular application in shops where only direct current is available for the driving motor of the welding set. It is designed so that either a 230 or 550-volt driving motor may be used. The construction permits use either as a portable or stationary unit.

Driving motor and generator have a common frame and common shaft, supported by ball bearings. The control, mounted on top as a part of the frame, is protected by a sheet steel cabinet. Three wheels on roller bearings make the set readily portable and give the welder small overall dimensions and a low center of gravity. For stationary use the running gear can be omitted.

Rating of the unit, in accordance with the N.E.M.A. standards of practice, is 200 amp., 1 hr., 50 deg. C. rise in a resistance load at 25 volts. The welding range is 60 to 300 amp. The compound-wound driving motor maintains constant speed with a voltage fluctuation of not more than 10 per cent. The motor starting rheostat with low-voltage protection is inclosed and mounted in the sheet steel cabinet on top of the set.

Richard A. Feiss, Inc., Boston, engaged in specialized consulting service in management, organization and merchandising, has removed its offices to 470 Atlantic Avenue.

# European Steel Conditions Improving

German Lockout Finds Ample Stocks—British and French Makers Getting Better Tonnage—Conversion of Steel in Transit

(By Cablegram)

LONDON, ENGLAND, Nov. 19.

**D**EMAND for Cleveland pig iron is improving, mainly as a result of increasing domestic requirements. Consumers are buying more freely and withdrawals from makers' stocks are the largest for many months.

Hematite supplies are almost negligible, and some furnaces already are in arrears with deliveries. Prices are stiffening. Foreign ore is quiet.

Rolled iron and steel markets are moderately active in semi-finished and light-weight material, owing to the German lockout. But plants making heavy material are still badly in need of orders.

Tin plate inquiry is improving, although business still is slow. Makers are well placed for the early months of next year, but there is a shortage of orders for the remainder of the current year, and output is now below 70 per cent of capacity. All classes of wasters are now scheduled, at prices fixed at from 15s. to 16s. 9d. (\$3.64 to \$4.07) f.o.b. works port, according to specifications.

Galvanized sheets are in more active demand and prices are steadier. Black sheets are generally quiet.

## On the Continent of Europe

Continental markets are less excited over German developments, and prices are easing. Further declines are an-

ticipated if the lockout ends soon, as German supplies are ample and the Steel Works Association has authorized the release of certain quantities for export.

Moscow is to build an underground railroad (subway) at a cost of R. 55,000,000. [At 1913 rates of exchange, this would have represented about \$28,325,000.]

## German Lockout Threatens to Spread

Suspension of Steel Output, However, Will Have No Immediate Effect on Manufacturing Consumers

BERLIN, GERMANY, Nov. 7.—The lockout of 225,000 men employed in the Northwestern iron and steel industries has been under way since Nov. 1. The area involved normally produces 80 per cent of Germany's heavy iron and steel as well as a large part of the country's finished products. Virtually all producers in this section have entirely ceased operations. The wage dispute threatens to spread to other areas, such as Solingen and Hagen-Schwelm, with the possibility that an additional 100,000 men will be thrown out of work.

The original dispute, in the "Northwestern group," began with a denunciation of the existing wage agreement by the employees, followed by a demand for a wage increase of 15 pfennigs an hour for all workers over 21 years of age. The employers offered certain minor wage advances, affecting a few thousand men, and

gave notice of a lockout, to begin Nov. 1. An arbitrator appointed by the Government awarded an advance of 6 pfennigs an hour for time workers, which would have raised the hourly wage rate from 78 to 84 pfennigs, and an advance of 2 pfennigs an hour to the "time supplement" received by piece workers. The piece workers predominate in the heavy branches, time workers in the manufacturing branches. The increase to the piece workers, on basis of a 48-hr. week, would have been less than 25c. a week.

The employees accepted the arbitrator's decision, but the employers rejected it. The Minister of Labor, Herr Wissell, a Socialist, thereupon declared the arbitration decision binding on both parties, under a clause of an ordinance of 1923 that gives the Government such power. The employers on two different grounds declared the minister's action invalid

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.....	£0 17½s.		\$4.25	
Bilbao Rubio ore.....	1 2	to £1 2½s.	5.35	to \$5.48
Cleveland No. 1 foundry.	3 8½	to 3 9½	16.64	to 16.89
Cleveland No. 3 foundry.	3 6		16.04	
Cleveland No. 4 foundry.	3 5		15.80	
Cleveland No. 4 forge...	3 4½		15.68	
Cleveland basic (nom.)...	3 5		15.80	
East Coast mixed.....	3 10	to 3 11	17.01	to 17.25
East Coast hematite.....	3 10½	to 3 11½	17.13	to 17.37
Rails, 60 lb. and up.....	7 15	to 8 5	37.66	to 40.10
Billets.....	6 5	to 6 10	30.37	to 31.59
Ferromanganese.....	13 15		66.83	
Ferromanganese (export)	14 0		68.04	
Sheet and tin plate bars,				
Welsh.....	6 0		29.16	
Tin plate, base box.....	0 18	to 0 18½	4.37	to 4.40
Black sheets, Japanese				
specifications.....	13 7½		65.00	
Ship plates.....	7 12½	to 8 2½	1.63	to 1.74
Boiler plates.....	9 0	to 10 10	1.92	to 2.25
Tees.....	8 2½	to 8 12½	1.74	to 1.84
Channels.....	7 7½	to 7 17½	1.58	to 1.69
Beams.....	7 2½	to 7 12½	1.53	to 1.63
Round bars, ¾ to 3 in..	7 10	to 8 0	1.62	to 1.69
Steel hoops.....	9 0	to 10 0	1.92	to 2.14
Black sheets, 24 gage....	10 0		2.14	
Galv. sheets, 24 gage....	13 10	to 13 15	2.93	to 2.98
Cold rolled steel strip, 20				
gage, nom.....	16 0		3.42	

\*Ex-ship, Tees, nominal.

## Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)			
Foundry pig iron (a):			
Belgium.....	£3 3s.	to £3 5s.	\$15.31 to \$15.80
France.....	3 3	to 3 5	15.31 to 15.80
Luxemburg.....	3 3	to 3 5	15.31 to 15.80
Basic pig iron (a):			
Belgium.....	3 3		15.31
France.....	3 3		15.31
Luxemburg.....	3 3		15.31
Coke.....	0 18		4.37
Billets:			
Belgium.....	5 2		24.78
France.....	5 2		24.78
Merchant bars:			
Belgium.....	6 4		1.37
France.....	6 4		1.37
Luxemburg.....	6 4		1.37
Joists (beams):			
Belgium.....	5 4		1.15
France.....	5 4		1.15
Luxemburg.....	5 4		1.15
Angles:			
Belgium.....	6 2½		1.35
¾-in. plate:			
Belgium (a).....	6 13		1.47
Germany (a).....	6 13		1.47
¾-in. ship plate:			
Belgium.....	6 8		1.41
Luxemburg.....	6 8		1.41
Sheets, heavy:			
Belgium.....	6 1		1.33
Germany.....	6 1		1.33

(a) Nominal.



and illegal, brought a suit in a court of law to obtain a judicial review of the case, and closed down their works.

A court decision on the disputed point cannot be given before the middle of the month. No further official efforts have been made to terminate the dispute, but the question has been up before the Prussian Diet, and both parties have declared themselves ready to negotiate. The lockout may last for weeks, but may terminate any day. Both sides have sizable "war chests."

The lockout so far has had little effect upon manufacturing outside the district involved. The Stahlwerksverband has ceased booking home and export orders, but has not stopped deliveries against old orders. The Pig Iron Syndicate has taken no action whatever. Prices have not been changed, and it is expected that the usual monthly syndicate meetings that fix prices and selling conditions will not be held until the dispute is settled. Deliveries of scrap have ceased, and ore orders from abroad have been countermanded except in the case of ore already under way. Domestic manufacturers are not threatened with an immediate shortage of materials. Considerable stocks are in the hands of producers and traders. Manufacturers of small metalware

have for some time past been producing largely for stock, and will therefore suffer little should material run short. Should the lockout, contrary to expectations, last a long time, the home market will have to depend upon imports. South Germany will be supplied by the Saar; but it is doubtful whether the French and Belgian works, which before the lockout had abundant work and which will obtain further orders owing to the cessation of German exports, will desire to supply the German market. As a result of the lockout the Belgian market, which showed slight weakness at the end of October, is again firm, and the price tendency is slightly upward.

Until the lockout terminates, Germany will be eliminated from the international market, so far as exports of heavy iron and steel are concerned. Her net exports in this branch in September were 304,000 tons, against 101,000 tons in January and a monthly average of 137,000 tons in 1927. Her production of iron and steel, which this year promised to be only a little behind that of the boom year 1927, will suffer materially. Exports of machinery are not likely to decline unless the lockout lasts a long time. Engineering firms announce that they will continue to execute all orders promptly.

rates are higher in Germany. The exporter in such a transaction pays interest on the cost of converting the wire rods into wire for from 30 to 60 days, but the extra profit more than compensates for this expense. At present there is an active demand upon mills near the German frontier and on the way to a port, and the volume of such business is increasing rapidly. The problem is proving a serious one to the German syndicates and producers, and no solution has been found.

### Britain Looking to Continent for Steel Outlet

LONDON, ENGLAND, Nov. 9.—Chief interest in the British iron and steel trade has centered in the turn of events on the Continent, and in particular the German lockout. So far no real effects of the lockout have been felt, except that in certain cases the supplies of raw material have been curtailed, but as most of this material has been coming from Belgium, France and Luxemburg, this stoppage is not very important.

What is looked for, however, is the chance of exporting to Germany. It is this possibility that is focusing the attention of British makers, especially of those engaged in the manufacture of heavy material for shipbuilding and allied trades.

In the meantime business generally in this country continues small. Producers of heavy rolled steel are struggling to secure sufficient orders to keep their plants regularly employed, but some of the mills rolling lighter material are not in such an unfavorable position. Orders coming in for pig iron are meager, except for some brands of hematite, which have been selling well, especially to Italy. Cleveland pig iron is quiet generally. Local steel works are absorbing the restricted output, and any material improvement in the demand would undoubtedly force the lighting of additional blast furnaces. At the moment, however, consumers show little inclination to purchase other than on a hand-to-mouth basis.

### German-Austrian Coke-Ore Contract to Be Revised

WASHINGTON, Nov. 19.—Since the German-Austrian coke and iron ore exchange contract has lost most of its significance, as a result of changed business conditions during the past two or three months, the United Steel Works of Germany has begun negotiations looking to the preparation of a new contract, according to James E. Wallis, Jr., American trade commissioner at Berlin. The present contract, made between the German company and the Alpine Mining Co. of Austria, provided that the former was to deliver 240,000 tons of coke a year and the Alpine company 120,000 tons of ore a year.

Figures given out by the German

## European Exporters Convert in Transit Make Greater Profits by Buying Semi-Finished Steel in Germany for Conversion in Other Countries

BREMEN, GERMANY, Nov. 3.—Conversion of material in transit on an international scale is a recent European development that is causing some uneasiness among German manufacturers of bolts, nuts, screws, wire and heavy hardware. Wages paid in these plants are slightly higher in Germany than in most of the surrounding countries, such as France, Belgium, Luxemburg, the Saar, Poland and Czechoslovakia. In addition, the German syndicates control prices, so that concessions, even for export, are seldom permitted. As a result, exporters at Hamburg, London, Rotterdam and other large centers of the export trade have been buying raw materials or semi-finished material in Germany, which they ship to a neighboring country, where the cost of conversion is less than at a German mill, and then export to the foreign market where the finished product has been purchased.

When the material is intended for shipment to an overseas consumer, the semi-finished steel is shipped to a mill in Belgium, the Saar or Luxemburg, from whence it can continue in the form of the product required to the port of Antwerp. If the order is from a buyer in Southeastern Europe, a mill in Czechoslovakia may be selected, and, when intended for ultimate use in a Scandinavian country, a Polish mill receives the order and the German semi-finished material.

In the case of wire rods the domestic prices in all European countries are considerably higher than the export market, so that by buying the rods in Germany and shipping them to another country to be drawn into wire, there is a considerable saving. While a duty is paid on the material when it is shipped into another country from Germany, when it is re-exported the owner of the material receives the refund.

One example of this new trade may serve as an illustration. An exporter in London sells 500 tons of galvanized wire f.o.b. Argentine port at a base price of £9 12s. 6d. (\$46.78) per ton. By the new method of having material converted in transit, the exporter buys 505 tons of wire rods in Germany at £6 2s. 6d. (\$29.77) per ton, delivered at a Belgian mill, where it can be converted under present market conditions at £2 7s 6d. to £2 10s. (\$11.54 to \$12.15) per ton, which brings the cost to a maximum of £8 12s. 6d. (\$41.92) per ton. To this must be added about 7s. 6d. (\$1.82) per ton for transportation, making the total cost, f.o.b. the Argentine port, £9 (\$43.74) per ton—a profit to the exporter of 12s. 6d. (\$3.04) per ton.

No German mill could convert these wire rods into galvanized wire at the low prices of Belgian and other foreign mills, as wages, as well as taxes, social charges and railroad freight

statistical office show that the result of the agreement was a strong revival of the German coke trade with Austria. Sales of German coke to Austria increased from a monthly average of 8400 tons during the first quarter of 1927 to an average of 40,700 tons a month during the last quarter of that year. This figure exceeded the monthly average for the first quarter of 1928, which was 32,500 tons. During the April-August period the high-

est monthly total was 19,894 tons, in July.

Beginning with the third quarter of 1927 imports of iron ore into Germany from Austria averaged something over 10,000 tons a month and remained approximately at this level through May, 1928, but dropped to 4310 tons in June, 442 tons in July and only 70 tons in August, the latest month on which a report has been made public.

## French Export Trade Good

### Domestic Market Quiet Following Heavy Buying in October —Luxemburg Adds to Pig Iron Capacity

PARIS, FRANCE, Nov. 5.—Probably as a result of heavy buying in October, in expectation of a further price increase, the iron and steel market here has been quieter in the past few days. Domestic consumption of pig iron has been good, but sellers admit that competition of British foundry iron has necessitated special quotations to consumers near the Coast. Pig iron output in Luxemburg is large, with furnaces increasing their production. Export orders for steel products and semi-finished material are sizable, and rolling stock manufacturers report some desirable business from other European countries, one such contract being for four locomotives burning shale oil, bought from Societe Corpet Louvet et Cie. at La Courneuve by the Estonian railroads. This is understood to be the first part of a program that calls for the purchase of 60 locomotives.

Illegal export of iron and steel scrap continues to be a much discussed subject in the steel industry and Government circles. Despite efforts of the Government to prevent exports of old material needed by French producers, old rails and ships to be dismantled for their scrap have been sold out of the country, so that a revision of the present regulations on scrap exports is expected.

**Pig Iron.**—The hematite iron market is unchanged, except that tonnages are still being sold as semi-phosphoric iron to be used for mixture, taking a lower price than is openly quoted for hematite. In Luxemburg the Acieries Reunies de Burbach-Eich-Dudelange is replacing its six blast furnaces with three new furnaces having the same total capacity. Other large producers are following a similar program of modernization. The Ougree-Marihayé works is remodeling its furnaces at the Rodange works to produce a total of 400 tons of pig iron a day instead of 180 tons. Improvements are being made at the Differdange works and the Rumelange plant, closed since the war, is to resume operations. Increased pig iron output with modern equipment is expected to reduce costs considerably.

**Semi-Finished Material.**—Export business continues good, and prices

are firm at £5 2s. (\$24.78) per ton for billets.

**Finished Products.**—Domestic business is smaller than early in October, but prices are firm and deliveries on most products range from three to six months. Export quotations are strong, and a good volume of trade is reported by most mills. Merchant steel bars for export are quoted at about £6 3s. per ton (1.35c. per lb.), f.o.b. Antwerp. In the Eastern domestic market, merchant bars are maintained at 740 to 750 fr. per ton (1.30c. to 1.32c. per lb.). Special shapes range from 950 fr. per ton (1.60c. per lb.) to as much as 1200 fr. per ton (2.12c. per lb.), f.o.b. mill. The sheet market is substantially unchanged except for a slight tendency to advance prices quoted on light-gage sheets.

### Lockout Does Not Affect All German Steel Producers

HAMBURG, GERMANY, Nov. 3.—The lockout in the German steel industry does not affect all producers. On Nov. 3, about one-third of the pig iron producers, 28 per cent of the steel ingot producers and 37 per cent of the makers of finished products were in operation. The lockout, however, is general in the Ruhr, districts excluded being the left bank of the Rhine, the Eastern Valley in Westphalia and all of the industry in Silesia, Saxony and Central Germany.

### Duffield Process for Direct Conversion From Ore

LONDON, ENGLAND, Nov. 9.—An interesting sidelight was thrown upon the Duffield process for producing iron and steel direct from the ore at a recent meeting of the Duffield Iron Corporation. C. E. Stearns, the chairman, remarked that the iron resources in the locality of the works (Adderbury, Oxfordshire, England) are sufficient to supplant imported iron ore, to offset importations of unfinished iron and steel into this country and to cover the total iron and steel requirements of England for generations, if worked and fabricated with

plants especially adapted to the physical conditions of the ore and the general circumstances of the locality.

Average analysis of the ore face showed 36.7 per cent iron, the bottom seam being carbonate ore, lean in iron, and this would not be worked. There was estimated to be 1,000,000 tons on the property, available for being readily mined. The designed capacity of the plant now being erected is from 350 to 500 tons a week.

It is expected that a unit of iron will cost  $\frac{3}{4}$ d.; in the case of Oxford and Northampton ore, delivered at the blast furnace in Wales and Middlesbrough, in accordance with general practice, the cost is  $\frac{4}{4}$ d. per unit. The difference is over 30s. (\$7.30) a ton, apart from the economics of the process. The Duffield process is designed to use bituminous black coal costing from 10s. to 12s. (\$2.40 to \$2.90) a ton, as against coke at from 20s. to 30s. (\$4.85 to \$7.30). Iron purer than ordinary pig iron may be produced at 32s. 6d. (\$7.90) a ton, and steel ingots at 50s. (\$12.15). This process, if developed, may mean a radical cheapening in the costs of iron and steel production in Great Britain.

### German Iron Mines Suspend Operations

HAMBURG, GERMANY, Nov. 3.—It is generally accepted that before long the last of the German iron mines will have been closed. General suspension was contemplated in 1927, but the protracted strike at the mines in Sweden enabled the German producers to continue operation. Shipments of iron ore from Sweden have been resumed at a normal rate, and the two large steel corporations, Friedrich Krupp A. G., Essen, and the Vereinigte Stahlwerke A. G., Düsseldorf, have suspended operation of their Siegerland mines, which have been producing about 40 per cent of the total German iron ore output of about 5,000,000 tons annually. Other mines are expected to close, as the German iron ore is rather poor and well under the surface and the mines are subject to a large influx of water. The total German output has represented about 25 per cent of the country's consumption.

### Sharp Drop in Mechanical Stoker Sales

WASHINGTON, Nov. 17.—Mechanical stokers to the number of 100, with 27,219 hp., were sold in October, against 161 with 65,060 hp. in September, according to the Department of Commerce. For the 10 months ended October, sales totaled 1272 stokers, with 428,537 hp., compared with 1224 units with 434,445 hp. for the corresponding period of last year. The October rating was the lowest since January, but was almost identical with October, 1927.



## Fabricated Structural Steel

Awards of 47,300 Tons Include Large Plate Tonnages—  
Only 12,000 Tons in New Projects

WITH 12,000 tons of plates in a group of oil storage tanks at Houston, Tex., and 10,000 tons in a municipal water line at Philadelphia, fabricated structural awards reported in the last week totaled nearly 47,300 tons. A group of buildings for the A. M. Byers Co. at Pittsburgh took 4000 tons, a Cleveland hospital 3000 tons, and a brass and copper mill at Cleveland 3000 tons. New projects, calling for only 12,000 tons, included no jobs of outstanding size. Awards follow:

BROOKLYN, 1560 tons, apartment building, Garfield Place, to Hedden Iron Construction Co.

NEW YORK, 900 tons, office building, Thirty-sixth Street and Fifth Avenue, to Taylor-Fichter Steel Construction Co.

NEW YORK, 515 tons, apartment building on East Twentieth Street, to A. E. Norton, Inc.

NEW YORK, 200 tons, subway station work for city, to Harris Structural Steel Co.

NEW YORK, 132 tons, float bridge and galleys for Reading Co. at Port Richmond, to Bethlehem Steel Co.

WHITE PLAINS, N. Y., 360 tons, People's National Bank Building, to Hay Foundry & Iron Works.

PHILADELPHIA 1000 tons, Philadelphia General Hospital, to McClintic-Marshall Co.

PHILADELPHIA 10,000 tons, municipal water line of seven miles of 6-ft. and 8-ft. riveted pipe, to Witt-Humphrey Steel Co., Greensburg, Pa.

PHILADELPHIA 500 tons, store, offices and garage building at Chestnut and Twenty-first Streets, to Bethlehem Fabricators, Inc.

PHILADELPHIA 2200 tons, plant for United States Gypsum Co., to American Bridge Co.

CAMDEN, N. J., 440 tons, sheet steel piling for City Hall and annex to County Court House; 220 tons to Jones & Laughlin Steel Corporation and 220 tons to Bethlehem Steel Co.

WASHINGTON, 2600 tons, Government Printing Building, to Lehigh Structural Steel Co.

DISTRICT OF COLUMBIA, 300 tons, highway bridges, to unnamed fabricator.

DURHAM, N. C., 258 tons, building for Duke University, to Virginia Bridge & Iron Co.

BIRMINGHAM, 200 tons, addition to American Cast Iron Pipe plant, to Southern Steel Works Co.

NEW ORLEANS, 175 tons, Y. M. C. A. gymnasium, to unnamed local fabricator.

HOUSTON, TEX., 12,000 tons, oil storage tanks for Roxana Petroleum Corporation, to Chicago Bridge & Iron Works.

PITTSBURGH, 4000 tons, buildings for A. M. Byers Co., to Fort Pitt Bridge Works.

CLEVELAND, 3000 tons, new plant for Chase Brass & Copper Co., to Austin Co.

CLEVELAND, 3000 tons, University Hospital group, to McClintic-Marshall Co.

DETROIT, 1900 tons, building for Murray Corporation, to Mahon Structural Steel Co.

CHICAGO, 100 tons, building for Illinois Tool Works, to New City Iron Works, local.

CHICAGO, 500 tons, store on South State Street, to American Bridge Co.

CHICAGO, 280 tons, McCrory store, to Duffin Iron Co., local.

HARVEY, ILL., 500 tons, building for Buda Co., to American Bridge Co.

HERMANN, MO., 1800 tons, bridge across Missouri River, to Kansas City Structural Steel Co.

SAN FRANCISCO, 185 tons plates, 20-in.

shore pipe, United States Engineers' Office, to Pacific Coast Engineering Co.

HONOLULU, 456 tons, plates and shapes, two barges for Inter-Island Steam Navigation Co., to Bethlehem Shipbuilding Corporation, San Francisco.

SAN FRANCISCO, 110 tons, plates and shapes, steel barge for unnamed interest, to Bethlehem Shipbuilding Corporation.

OAKLAND, CAL., 103 tons, factory on Cotton Street, to California Steel Co.

LOS ANGELES, 800 tons, plates, two 134,000-bbl. oil storage tanks for General Petroleum Corporation, to Western Pipe & Steel Co.

LOS ANGELES, 370 tons, plates, 40-in. welded pipe for city, to Llewellyn Iron Works.

### Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON & MAINE RAILROAD, 2100 tons, 24 bridges.

## Railroad Equipment

Orders for 800 Freight Cars—  
Wabash to Buy 55 Locomotives

ORDERS for freight cars placed during the week included 500 box cars for the Chicago Great Western and 300 ore cars for the Great Northern. Among the larger inquiries were 200 ballast cars for the Chicago & North Western, 500 hopper cars for the Boston & Maine and 200 tank cars for an Oklahoma oil company. The Wabash is soon expected to enter the market for 55 locomotives and the Chicago & North Western for 10. Details of the week's business follow:

Great Northern has ordered 300 ore cars from Standard Steel Car Co.

Chicago Great Western has ordered 500 box cars from Pullman Car & Mfg. Corporation.

Northwestern Pacific has purchased five motor and five trailer coaches from St. Louis Car Co.

Chicago & North Western is inquiring for 200 50-ton steel ballast cars, in addition to 300 flat and 25 hopper cars under negotiation. This road is also expected to make inquiry for 10 locomotives.

Fruit Growers Express is inquiring for 50 underframes for refrigerator cars.

Armour Car Lines, Chicago, are inquiring for 500 refrigerator car underframes.

Boston & Maine contemplates purchasing 500 70-ton hopper cars.

Imperial Oil Refining Co., Tulsa, Okla., is inquiring for 200 tank cars.

Nevada Consolidated Copper Co. has ordered 20 Ingoldsby-type ore cars from Koppel Industrial Car & Equipment Co.

Chicago, Rock Island & Pacific is in market for 50 steel cap caboose cars and two parlor cars.

BOSTON, 300 tons, freight house for New York, New Haven & Hartford Railroad.

WESTCHESTER, COUNTY, N. Y., 150 tons, highway bridge.

ORANGE, N. J., 1000 tons, Memorial Hospital.

ELIZABETH, N. J., 2500 tons, manufacturing building; Turner Construction Co., general contractor.

NORRISTOWN, PA., 500 tons, Montgomery County Court House; Golder Construction Co., Philadelphia, and Henry A. Batton, Philadelphia, low bidders on alternate specifications.

WILLIAMSBURG, VA., 600 tons, building for Williamsburg College.

WASHINGTON, 350 tons, produce stores for Pennsylvania Railroad.

SAN ANTONIO, TEX., 200 tons, Gross Building.

ROSITA, MEX., 1000 tons, building for American Smelting & Refining Co.

CLEVELAND, 200 tons, bridge for Cleveland Union Terminals Co.

CHICAGO, 280 tons, store building on Milwaukee Avenue.

DELTON, WIS., 280 tons, State highway bridge across Wisconsin River; bids on general contract close Nov. 27.

SEATTLE, 550 tons plates, 24-in. pipe line; bids opened.

SEATTLE, 425 tons, sawmill for Weyerhaeuser Lumber Co.; bids being taken.

VANCOUVER, B. C., 125 tons plates, 18-in. pipe line; bids Dec. 11.

SAN FRANCISCO, 1500 tons, apartment building, Sacramento and Gough Streets; bids to be taken next week.

Wabash Railroad is preparing specifications for 55 locomotives.

## Reinforcing Steel

Awards and Inquiries Decline  
Sharply

AWARDS of less than 2600 tons represented one of the lowest totals of the year, while new projects amounted to only 650 tons. Awards follow:

MILWAUKEE, 800 tons, Catholic school, to American System of Reinforcing.

MILWAUKEE, 500 tons, Cudahy apartment building, to American System of Reinforcing.

EVANSTON, ILL., 110 tons, cafeteria, to Concrete Steel Co.

CHICAGO, 600 tons, building for Stewart-Warner Speedometer Corporation, to Barton Spiderweb System.

SACRAMENTO, CAL., 206 tons, highway work in San Diego County, to unnamed interest.

SACRAMENTO, 129 tons, bridge in Orange County, to unnamed interest.

SANTA CRUZ, CAL., 225 tons, hotel, to Truscon Steel Co.

### Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

CHICAGO, 187 tons, apartment building at 550 Arlington Place.

CHICAGO, 143 tons, apartment building at 515 Briar Place.

CHICAGO, 110 tons, West Hotel at 20 South Des Plaines Street.

CHICAGO, 100 tons, apartment building at 915 Edgecomb Place.

CHICAGO, 100 tons, apartment building at Seventy-second Street and Coles Avenue.

### Address on Costs Features Foundry Equipment Meeting

When indirect labor and factory burden equal 5 or 6 per cent of the sales total, a situation has arisen that calls for executive attention, said W. Clement Moore, assistant district manager Wolf & Co., industrial engineers, Philadelphia, in addressing a meeting of the Foundry Equipment Manufacturers Association at New York, Nov. 20. Well managed plants keep this cost down to 3 or 4 per cent, he said.

The successful operation of a plant, Mr. Moore stated, requires that all important facts regarding the business be available every month so that comparisons can be made with previous months, and for the year to date with corresponding periods in previous years. In this way the management can put its finger on conditions that call for correction. Such monthly statements should be prepared for the business as a whole and by departments, and both types of analyses should include the following: Total sales, gross profits, material costs, direct labor costs, indirect labor costs, factory burden, selling and administrative costs and delivery costs.

Despite generally prosperous conditions, he said, there is a surprisingly large mortality among smaller corporations. The number of business failures in October was 200 more than in the same month in 1927. In large part, profits are being made by the larger corporations. Last year \$24,000,000,000 worth of business was done in this country without a dollar of profit. Out of 452,000 corporations, nearly 45 per cent showed losses. Moreover, out of all the profits made, only 1119 corporations accounted for 33½ per cent. Among manufacturing corporations, 95 out of a total of 89,000 companies made nearly 50 per cent of all the profits.

An important reason for this showing, Mr. Moore said, is that while total business is large there is constant pressure for lower prices. Since high wages constitute one of the mainstays of commodity demand, business must find ways of maintaining a spread between costs and selling prices without reducing wages. This calls for increased efficiency in production and the reduction of waste in administration and marketing. No doubt the necessity for reducing costs has been a prime cause for industrial mergers. In the past two years there have been more consolidations than in any previous 10 years.

Never before has there been such a pressing need for knowing one's business thoroughly. Large corporations maintain research bureaus and statistical organizations. Similar information can be obtained cooperatively in trade associations. Trade bodies should supply their members periodically with data showing average prices and average costs, so that each company may compare its own condition with that of the industry as a

whole. It is always important to know whether one is progressing or not.

The meeting was under the chairmanship of S. C. Vessy, W. W. Sly Mfg. Co., Cleveland, president of the association. A feature of the program was the presentation of a leather and ivory mounted jewel box as a token of appreciation to T. W. Pangborn, Pangborn Corporation, Hagerstown, Md., who was president of the association in 1927. A motion was passed approving a federation of machinery trade associations. A summary of business conditions revealed a favorable situation. The three-month moving average of foundry equipment orders in October, at 211 (100 equals average monthly shipments in 1922, 1923 and 1924), was the highest index ever reached in a record kept since the first quarter of 1925.

### Timken Company Increasing Bearings Capacity

The Timken Roller Bearing Co., Canton, Ohio, has announced expansions to its production facilities, which, when completed, will enable the company's output of bearings to be increased from 175,000 daily to 200,000. Work has already been started on various extensions to the bearings factory. The program has called for the expenditure of \$6,000,000 during the current year and has included additions to the steel mill as well as the bearings factory.

### Ten-Month Record in Motor Trucks

WASHINGTON, Nov. 20.—Production of motor vehicles in the United States in October totaled 398,818 units, of which 341,705 were passenger cars and 57,113 were trucks, according to the Department of Commerce. Production in September totaled 415,283, of which 358,872 were passenger cars and 56,411 were trucks. Canadian production in October amounted to 18,536, of which 13,016 were passenger cars and 5,520 were trucks, comparing with a total of 21,193 in September, of which 16,572 were passenger cars and 4,621 were trucks.

For the 10 months through October United States production was 3,869,009 vehicles, of which 3,405,942 were passenger cars and 463,067 were trucks. This compares with a production of 3,133,385 for the corresponding period of last year, 2,730,760 units being passenger cars and 402,625 trucks. Canadian production totaled 221,188 during the 10 months of the current year, of which 181,849 were passenger cars and 39,399 were trucks. For the corresponding period of last year Canadian production was 169,331 vehicles, of which 139,420 were passenger cars and 29,911 were trucks.

[United States production for 10 months is fractionally lower than in 1926, when the total was 3,874,574 vehicles, of which 3,446,484 were pas-

senger cars and 428,090 trucks. In trucks the current year has seen the greatest number ever produced in a like period. Except for 1925, production last month was the heaviest in any October.]

### Witt-Humphrey Steel Co. Takes Large Pipe Job

The Witt-Humphrey Steel Co., Greensburg, Pa., has received a contract from the Bureau of Water, Philadelphia, for a pipe line consisting of 7 miles of 6-ft. and 8-ft. steel pipe. The contract will require approximately 10,000 tons of 9/16-in. steel plate, which will be riveted at Greensburg and shipped to Philadelphia in 38-ft. sections. The pipe will be protected against corrosion by being dipped vertically in a bath of special refined asphaltum. The company is at present completing an 8-ft. pipe line for the city of Detroit, and will begin making shipments on the Philadelphia job about Jan. 1.

### Plan Steel Plant and Ore Exportation in Brazil

The Itabira Iron Ore Co., Ltd., Rio de Janeiro, Brazil, controlled by the Farquhar group headed by Percival Farquhar, 120 Broadway, New York, has obtained a concession from the Brazilian President to export ore deposits at Itabira in the Brazilian State of Minas Geraes. The contract calls for the construction of a steel plant consuming 150,000 tons of ore annually, which will probably be built by a Chicago firm.

The company will reconstruct the Victoria-Minas railroad with an extension to Itabira and a branch line from Colatina to Port Santa Cruz, where extensive equipment will be installed for the handling of ore and coal. It is planned to export from 3,000,000 to 5,000,000 tons of ore annually. Coal for the plant will be imported duty free and the ore will pay a reduced export tax. The concession includes the Itabira Peak, containing approximately 170,000,000 tons of hematite, said to contain 67 to 68 per cent iron. The project will require an expenditure of \$75,000,000.

### Continental Can Acquires Wheeling Can Co.

The Continental Can Co., Inc., New York, has acquired the plants, machinery and business of the Wheeling Can Co., Wheeling, W. Va., subsidiary of the Wheeling Steel Corporation. The purchase includes two modern plants in the Wheeling district, manufacturing a diversified line of cans, and conveniently located to tin plate mills. Plants will be operated as before without important changes in policy or personnel and will be used by the Continental company as outlets to the South and Southwest.



## Coal Stocks Decline at Steel Plants

WASHINGTON, Nov. 20.—Stocks of coal at by-product coke plants have increased during the past quarter, but the supply on hand at steel works has declined slightly, according to a survey by the Bureau of Mines. Complete returns from the by-product plants showed a total of 5,193,486 tons of coking coal in storage on Oct. 1, of which 1,209,058 tons was low volatile and 3,984,428 tons of high volatile. The steel works and rolling mills reporting had 909,599 tons of steam coal on hand and 586,673 tons of gas coal, a total of 1,496,272 tons. In terms of days' supply, the stocks of low volatile coal on hand at by-product plants on Oct. 1 was 28 and of high volatile 27 against 24 and 25, respectively, on Aug. 1. Steel works had 30 days' supply of gas coal and 32 days' supply of steam coal on hand on Oct. 1 compared with 32 days' and 35 days' supply, respectively, on Aug. 1. On July 1 stocks of coal at by-product plants represented 23 days' supply, while at steel works there were reserves of 38 days' supply. On Oct. 1, 1927, there were 40 days' and 58 days' supply, respectively, the highest on record since Jan. 1, 1919.

The total stocks of bituminous coal in the hands of all consumers on Oct. 1, 1928, amounted to 41,100,000 tons, a decrease of 600,000 tons under supplies on hand Aug. 1, and 20,000,000 tons under the unusually heavy reserves on hand on Oct. 1, 1927.

## Larger Shipments of Mining Locomotives

Mining and industrial electric locomotives shipped in the quarter ended Sept. 30 are reported by the Department of Commerce at 141 units, with a value of \$860,305. This is a considerable gain over the preceding quarter, when 111 units were shipped, valued at \$729,458. The total is lower, however, than in any quarter of last year, or than in any of the three latest quarters of 1926. In the September quarter of 1927 shipments were 193 units, valued at \$898,970.

## Iron and Steel Movement Into New England

The movement of commodities into and out of New England is shown in a bulletin entitled "The External Trade of New England," just issued by the Department of Commerce and prepared by Robert J. McFall, Domestic Commerce Division. Generally, the period covered is from Feb. 1, 1924 to Jan. 31, 1925. Where data are given for 1926 it is shown there

	Inward	Outward	Net Inward	Net Outward
Iron ore.....	1,534	215	1,319	.....
Iron, pig and bloom.....	560,780	12,468	548,312	.....
Rails and fastenings.....	75,214	17,380	57,834	.....
Bars and sheet iron, structural iron and iron pipe.....	862,665	143,169	719,496	.....
Other metals, pig, bar and sheet.....	396,763	89,564	307,199	.....
Castings, machinery and boilers....	156,501	289,314	.....	132,813

are no striking changes from the movement for the previous year.

Figures for the iron and steel and related lines are given in the accompanying table stated in net tons.

## Record River Movement of Steel from Pittsburgh

The down-river movement of iron and steel products from Pittsburgh district mills last month set a new high record. Shipments on the Ohio River, which are generally recognized as a reliable measure of the movement of these products for consumption beyond the confines of the Pittsburgh district, amounted to 130,808 net tons, the monthly report of the Pittsburgh office, United States Engineers' Corps, discloses. That compares with 125,062 tons in September and 80,423 tons in October last year. For the ten months ended Oct. 31, Ohio River shipments were 1,025,426 tons, or almost double those of the same period last year, when they were 557,927 tons.

## Heavy Orders for Foundry Equipment

Foundry equipment orders in October are reported at 182 net, on a basis of 100 as the average monthly shipments for 1922 to 1924. The gross orders of 185 compare with 170 in September and 278 in August. Except for August and last May, they have not been equalled since February, 1927; with that one exception, they are the highest in more than four years. Shipments in October were 254.3 on the same basis. Unfilled orders are reported at 462.6, and the three months' average of gross orders at 211.

## Heavier Production of Steel Barrels

WASHINGTON, Nov. 20.—Production of steel barrels in October increased to 656,021, or 56.4 per cent of capacity, against 593,255 barrels, or 50.2 per cent of capacity, in September, according to reports received by the Department of Commerce from 27 companies owning or operating 31 plants. Shipments in October were 661,009 barrels, compared with 595,640 barrels in September, while stocks at the end of each month were 50,071 barrels and 55,059 barrels respectively. Unfilled orders at the end of October for delivery within 30 days totaled 301,782 barrels, against 292,686 barrels at the end of September, while unfilled orders for delivery beyond 30 days were 522,090 barrels and 704,134 barrels respectively. Production during the 10 months ended with October,

1928, totaled 6,283,025 barrels, compared with 5,685,433 barrels for the corresponding period of 1927.

Members of the Steel Barrel Manufacturers Institute shipped 376,998 barrels in October, accounting for a business volume of \$1,143,898. Their plants were occupied to the extent of 58 per cent. I.C.C. capacity was engaged at an average of 40.7 per cent and capacity for light barrels at 63 per cent. Unfilled orders Nov. 1 called for 411,312 units.

## By-Product Coke Makes New Record in October

WASHINGTON, Nov. 19.—Production of 4,219,262 net tons of by-product coke in October set a new high record, while the output of 421,000 tons of beehive coke was the largest in any month since last March, and the output of 3,373,806 gross tons of pig iron was the largest since May, 1927, according to the Bureau of Mines. In comparison with September the daily rate of output increased 3.1 per cent for by-product coke, 25 per cent for beehive coke and 6.6 per cent for pig iron. Of the by-product coke produced in October, 3,335,000 tons, or 79 per cent, came from plants associated with blast furnaces and 884,000 tons or 21 per cent came from merchant or other plants.

By-product coke production in the first 10 months has aggregated 39,755,486 tons, a new high record. This exceeds by 2,800,000 tons, or 7.6 per cent, the previous record, made in 1926. Last year 36,774,884 tons was made in 10 months. Beehive coke output, on the other hand, was the smallest in several years, the 10-month total of 3,562,000 tons being less than one-third as much as in 1926 and only 57 per cent of the 1927 output.

Total coke production in 10 months was 43,317,486 tons—less than 1 per cent above last year and over 9 per cent below the high level of 47,661,000 tons reached in 1926.

## Cement Production Continues Heavy

Production of Portland cement in October is reported by the United States Bureau of Mines at 17,533,000 bbl., the largest figure ever reported for October. It was exceeded by the two preceding months and by August, 1927, but otherwise is the largest for any month. It compares with 17,856,000 bbl. in September and 18,730,000 bbl. in August, 1928 (the record). In October, 1927, production was 17,174,000 bbl.

Shipments in October are reported at 19,836,000 bbl. This gain is the largest for any October, and has been exceeded by only four earlier months, of which three were those immediately preceding it. There was a reduction from the 20,460,000 bbl. of September, but a heavy gain on the 18,105,000 bbl. of October, 1927.

For 10 months production made a new record, at 148,569,000 bbl.,

against the previous high of 145,460,000 bbl., made last year. Shipments in 10 months were 156,120,000 bbl., about 2 per cent above the previous record of 153,103,000 bbl., made in 1927.

## Canadian Iron and Steel Production Higher

October production of pig iron in Canada is reported by the Dominion Bureau of Statistics at 93,186 gross tons, compared with 90,516 tons in September, and with only 38,097 tons a year ago. Ferroalloys to the amount of 2127 tons were produced in October, against 2008 tons in September. For the first ten months of the year pig iron production has been 838,659 tons, an increase of about 38 per cent over the 608,511 tons of last year. There has been a drop in ferroalloys within the ten months from 47,649 tons to 35,541 tons.

Steel ingot production in October was 105,437 gross tons, compared with 97,275 tons in September. Adding castings, the total was 108,987 tons, against 99,888 tons in the preceding month and only 56,371 tons a year ago.

In the ten months ingot production has reached 993,476 tons, a gain of almost 300,000 tons over last year's 695,688 tons. Castings have amounted this year to 35,221 tons, against 34,972 tons in 1927.

There were seven furnaces in blast at the end of October, representing 2725 tons daily capacity. The four furnaces not operating had a listed capacity of 1350 tons daily.

## British Steel Trade Rises Sharply in October

WASHINGTON, Nov. 19.—Exports of iron and steel from the British Isles in October aggregated 377,390 gross tons, against 295,123 tons in September, while imports increased to 261,404 tons, compared with 184,464 tons, according to cablegrams received by the iron and steel division, Department of Commerce, from London. The largest export movement in October was galvanized sheets, 71,031 tons, compared with 50,116 tons in September. Tin plate ranked second, 54,210 tons against 35,270 tons. Exports of plates and black sheets totaled 45,798 tons, compared with 35,536 tons, while the outgoing movement of pig iron and ferroalloys was 43,439 tons, compared with 35,815 tons. The largest incoming products consisted of ingots and semi-finished steel, with a total of 119,914 tons, against 67,896 tons in September.

Production of pig iron increased to 543,600 tons from 503,900 tons, while the October output of steel ingots and castings aggregated 756,000 tons, compared with 718,600 tons. Active blast furnaces at the end of October totaled 136, against 131 at the end of September, while the number of open-hearth furnaces in operation decreased to 264 from 266.

## Sharp Drop in Wholesale Prices

Wholesale prices of commodities in October are reported by the United States Bureau of Labor Statistics at an index of 97.8, based on 100 as the average of 1926. This shows a drop of more than 2 per cent from the September average of 100.1, and compares closely with the 97 average of a year ago. The drop has come almost entirely from sharp declines in farm products, foods and hides and leather products, all of which declined more than 3 points and some of them more than 5 points. Changes both up and down in the seven other groups were fractional only.

Metals and metal products went up to 101, compared with 100.5 in September. The change came from an increase of the iron and steel items from 94.7 to 95.1 and of non-ferrous metals from 93.8 to 95.8. No change occurred in agricultural implements, automobiles or other metal products. The metals are about 4 per cent above the 97.1 of a year ago.

## October Sheet Production Gained, Orders Declined

Production of steel sheets by independent mills increased sharply during October, amounting to 369,243 net tons, compared with 318,907 tons in September, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers, Cleveland. Sales during October decreased to 344,614 tons, compared with 370,936 tons in September, and shipments also increased, resulting in some decline in unfilled orders on Nov. 1. The October report and comparisons in net tons follow:

	Oct.	Sept.	Aug.
Total number of mills.....	724	721	721
Capacity per month.....	508,000	450,500	506,000
Percentage reporting.....	70.2	70.1	70.1
Sales.....	344,614	370,936	254,397
Production.....	369,243	318,907	329,396
Shipments.....	354,925	322,876	324,691
Unfilled orders.....	525,161	539,960	498,023
Unshipped orders.....	100,800	102,313	102,825
Unsold stocks.....	49,800	44,519	51,636
Percentages to Capacity			
Sales.....	96.6	117.5	71.7
Production.....	103.5	101.0	92.8
Shipments.....	99.5	102.2	91.5
Unfilled orders.....	147.3	171.0	140.4
Unshipped orders.....	28.3	32.4	29.0
Unsold stocks.....	14.0	14.1	14.6

## Industrial Plants Asked to Mark Roofs for Airplanes

Industrial corporations have been asked to cooperate with the Daniel Guggenheim Fund for the Promotion of Aeronautics in a nation-wide campaign for roof markings which will identify the country's towns to the aviator. Such identification is a first requisite for an air transportation system.

In a printed bulletin the Fund describes the type of roof most suitable for marking and urges the use of block letters in chrome yellow with a

black background. It is suggested that it should be from 10 to 20 ft. in height and on roofs preferably of tiled shingles, tin or other metal, or slate where the visibility is not reduced by smoke. Besides the name of the town or city, the marking should include an arrow pointing due north with the letter "N" over it and a small letter indicating the airport if there is one.

## Worcester Machine Shops Unusually Busy

WORCESTER, MAES., Nov. 20.—The machine tool shops of Worcester are in a period of great activity which in the opinion of the manufacturers promises to continue for a long time. Orders have piled up in such volume that the larger establishments are not only running on a full-time daylight schedule, but are working night gangs, which are being increased as rapidly as skilled men can be found. The city is suffering from a famine of good machinists and toolmakers, and manufacturers have been compelled to seek help by advertising in the newspapers of other cities.

The Machine Division of the Norton Company, after reaching maximum daytime production, is operating some of its departments nights, with a prospect of extending this second shift. In addition to a large aggregate of business already on the books, this company has just received large orders from the Ford Motor Co., Chrysler Corporation and the General Motors Co. The Heald Machine Co. has been working night and day for some time. The Reed-Prentice Corporation has found it necessary to put on a night force, which is building up as rapidly as men can be hired. Other shops report similar conditions of active business, among them those of the Leland-Gifford Co., Stockbridge Machine Co., Arter Grinding Machine Co. and Francis Reed Co. The O. S. Walker Co. reports a heavy demand for magnetic chucks.

## Philadelphia Steel Club Elects Officers

The Steel Club of Philadelphia on Nov. 13 elected the following officers for the ensuing year: Willard S. Haring, Alan Wood Iron & Steel Co., president; Paul M. King, Worth Steel Co., vice-president; Samuel H. Baker, secretary-treasurer. Thomas C. Ham, Jones & Laughlin Steel Corporation, and W. W. Deal were elected to the board of governors.

"Photomicrography and Its Application to Mechanical Engineering," by Francis F. Lucas, is the title of a pamphlet issued by the Bell Telephone Laboratories, New York. It is a reprint of a paper presented at the annual meeting of the American Society of Mechanical Engineers in joint session with the Optical Society of America in New York, December, 1927. Some very fine reproductions of photomicrographs are included.



# This Issue in Brief

**Profit-sharing for executives** pays, especially for high men in small organizations. Payment of profits in common stock is preferable, says speaker at management meeting, because then the executive shares losses as well as profits.—Page 1291.

\* \* \*

**Cuts cost of locomotive repairing** by use of "spot system" of progressive work. Stripped engines are moved progressively to various designated sections of shop, each specializing on certain work. Time for each operation is scheduled. Repair schedules are prepared five months ahead.—Page 1279.

\* \* \*

**Sounder welds** are produced by coated electrodes, welding engineer declares. Chemical covering of the rod, he says, produces a gas which sheathes the arc, excluding harmful gases.—Page 1293.

\* \* \*

**Will present method of operating open-hearth furnaces** be obsolete in three years? Yes, says open-hearth man. He believes that the Stevens furnace, which takes the guesswork out of combustion, will be generally adopted. Better yield and considerable savings in fuel consumption and brickwork are claimed for this furnace.—Page 1296.

\* \* \*

**Denies that anti-trust laws** disregard economy and efficiency. Trade Commission may protect business by regarding as illegal any secret departure from resolutions a firm has led its competitors to believe it will observe.—Page 1282.

\* \* \*

**"Pretty miserable"** is term American economist applies to French wages. Though industry in France is busy and well above pre-war level, wages are so low that buying power of wage earners is very poor. Though wages are higher in England, industry there has not reached the pre-war level, and considerable forced idleness exists.—Page 1285.

**Better castings** produced by pouring locomotive frame molds on edge. Pouring can be done more easily and casting is less likely to warp.—Page 1286.

\* \* \*

**Tool steel buyers' problem** simplified by preparation of convenient table. Metallurgist provides a table showing chemical analyses of tool steels known to give excellent results for each kind of service.—Page 1286.

\* \* \*

**Central welding shop** will enable company to get maximum savings from use of welding equipment. Many firms fail to bear in mind that welding equipment used for production can also take care of repairs, cut up scrap, install pipe lines, etc. A central welding shop cuts costs by providing a common point for handling all jobs requiring welding.—Page 1284.

\* \* \*

**Price discrimination** may be regarded by Trade Commission as "unfair competition." Commissioner declares that firm price policy will be encouraged and that secret departures from prices openly established are frowned upon by the Trade Commission and may be classed as illegal.—Page 1283.

\* \* \*

**Steel can be made at lower cost** in large furnaces, say open-hearth men. Slightly greater yield is obtained from large furnaces owing to deeper bath, reducing amount of oxidation, as relatively less surface is exposed for each ton of steel present.—Page 1296.

\* \* \*

**"Bootleg loans"** upset forecasts by opening up new credit reservoir. Increase in credit volume is due to loans from firms and individuals, says Colonel Ayres, rather than to loans from banks. His forecaster shows business rising until the middle of 1930 and then dipping sharply, but he will not commit himself in view of the new factor — "bootleg loans." — Page 1299.

**Denies allegation** that sheet rolling industry is unprogressive. "Analysis of present development would give this industry a mentality of 12 years," A. S. M. E. official charges. Sheet manufacturers point to great amount of money spent on new continuous process as evidence of progressiveness. But for many years industry was in hands of mill men with little engineering knowledge.—Page 1301.

\* \* \*

**Shop superintendent** keeps track of plant operations closely by means of simple visual record. Round tags, each bearing number of a locomotive, are moved forward as repair work on engines progresses. Superintendent is thus able to tell quickly when any given engine will be ready for service.—Page 1281.

\* \* \*

**Zinc can be welded** with hardly any volatilization by using best brass welding rod with 0.5 per cent silicon added. And such a rod, when melted into a joint in alpha brass or admiralty brass pipe, will produce a strong, non-porous union, says metallurgist.—Page 1293.

\* \* \*

**You will lose money** if you cut prices to get more business than your market affords, association head tells fabricators. Decide what kind of work you can handle profitably; find out what tonnage can reasonably be expected to come out of your territory; develop a definite selling plan, and stick to it.—Page 1289.

\* \* \*

**Bronze-welding of steel** should not be done except on unimportant and non-stressed locations, says research worker. Otherwise internal stresses of at least 4000 lb. per sq. in. will occur, except in annealed metal.—Page 1293.

\* \* \*

**Makes hot strips from hot slab** in one rolling, without reheating. Strips are 24-gage, long length. This is done by a process recently developed, says rolling mill builder.—Page 1302.

A. I. FINDLEY  
Editor

# THE IRON AGE

W. W. MACON  
Managing Editor

ESTABLISHED 1855

## Our Tariff and Europe

SOME familiar anti-tariff war cries were missing from the late national campaign. Never since the first comprehensive act in protection of home industry was passed at Washington have the leading national parties been so nearly at one on this question, and never has the fear of tariff unsettlement figured so little in a presidential election.

Such approach to agreement on this subject, after the hard-fought battles of other years, is not encouraging to foreign manufacturers who had hoped the election of 1928 would bring a letting down of tariff barriers. Ever since the Armistice we have heard from Europe that if the allied nations are ever to pay their debt to the United States we must arrange to let more of their goods into our ports. The one way to make this possible, we have been told, is to lower our tariff schedules. Many of our own people have held the same view. Low-tariff men naturally took to it. Many protectionists saw the force of it, but generally wanted its application limited to lines of industry other than their own. Now that the national referendum has been had, certainly there is nothing in the election returns to indicate that the people of the United States are favorable to a freer entry of foreign goods, to the displacement of the products of workers in our own industries.

European critics of our tariff, like European advocates of the cancellation of European debts to the United States, have seemed at times to believe that, if a sufficient demonstration of ill will be made, this country can be induced eventually to bargain for its abatement. No headway in better understanding will ever be made by that route. In helpfulness to Europe the United States has been generous to a degree. Yet it cannot be said that this evidence of good will has been responded to in kind. Our European allies may well take to heart some of the plain but friendly speech of the President's address at Washington on the night of Nov. 11, particularly these words:

If we could secure a more complete reciprocity in good will, the final liquidation of the balance of our foreign debts and such further limitation of armaments as would be commensurate with the treaty renouncing war, our confidence in the effectiveness of any additional efforts on our part to assist in the further progress of Europe would be greatly increased.

American tariff policy must be determined in the light of American standards of living, American industrial development, trade expansion and the many other things which accentuate the difference between American life and European life. And what holds in respect to the tariff applies also to the continued invest-

ment of American capital in Europe, in view of the great demand that will be made upon our resources by power and transportation projects in the next few years. As President Coolidge aptly said: "Europe, on the whole, has arrived at a state of financial stability and prosperity where it cannot be said we are called on to help or act much beyond a strict business basis. The needs of our own people require that any further advances by us must have most careful consideration."

These words have added significance from the knowledge that in respect to this country's attitude to Europe the President and the President-elect have long been in hearty agreement.

## Less Merchant Iron, Better Prices

SINCE late in August the average market price of northern pig iron in the various districts has advanced considerably more than a dollar a ton, following a long period of declines. Reasons for such advances, depicted in our market reports, include the withdrawal of steel companies as sellers of merchant iron.

Statistics drawn from the monthly blast furnace reports of THE IRON AGE show clearly why the market should soften as it did for months and then pick up of late. There has been a remarkable divergence in the relative production of pig iron by steel companies and merchant furnaces. Of course it cannot be argued that the demand for steel and the demand for merchant iron should run precisely together, but surely they should not swing in opposite ways.

Late last year there was light demand for steel while there was heavy production of merchant iron. After January of this year merchant iron production declined, while in the last four months it has been at a steady and low rate. To bring out the divergence we compare the four months through January, with average daily rate of pig iron production by steel works of 66,407 tons, and a merchant furnace rate of 23,073 tons, with the four months through October, with a steel works' rate of 83,199 tons and a merchant furnace rate of 19,596 tons. In the first period the merchant furnaces produced 35 per cent as much as the steel works, while in the latter period they produced less than 24 per cent as much as the steel works. From the first period to the second steel works' production increased 25 per cent while merchant furnace production decreased 15 per cent.

These figures suggest strongly that pig iron must have been accumulating in the earlier period, for it is not conceivable that merchant iron demand was heavy when the steel works had such poor employment. It was well known in the trade a few months ago, as a matter of fact, that there were large stocks of merchant



iron. On the other hand it cannot be thought that the recent activity in steel has not been accompanied by a fair degree of activity on the part of consumers of merchant iron, an activity that could hardly be well taken care of by a rate of production evidently light by comparison with rates of the past.

Mere comparison of October figures is striking. In October, 1927, there was 66,991 tons of steel works iron and 22,819 tons of merchant iron daily. In October of this year there was 88,051 tons of steel works iron and 20,781 tons of merchant iron, and yet the northern steel works had largely withdrawn from the merchant pig iron market.

### Length of Bull Stock Markets

**S**OMETIMES statistics can be boiled down to simple terms, and then they are likely to show something important. We find such condensation possible with a presentation in the Cleveland Trust Company's circular of Nov. 15; it shows twelve bull stock markets in a half century, the number of months of each being given. One bull market began with the reopening of the exchange at the beginning of 1915. One may conveniently assume the present bull market to complete the present calendar year.

In the 14 years 1915 to 1928 inclusive, the bull markets cover a total of 111 months. The preceding 14 years, 1901 to 1914, included 51 months of bull movements, and the 14-year period before that, 1887 to 1900, included 74 months. Thus the latest period has had more than twice as much bull movement, in length of time, as the intermediate period, and one and one-half times as much as the first period. Fourteen years contain 168 months. In the first period there were bull movements during 44 per cent of the time; in the second, 30 per cent, and in the present, 66 per cent.

Various references to this remarkable stock market have been made in these columns. Here is a new angle from which it may be considered. The nub of the matter lies in the question whether this country has been growing, in one way or another, at a better or more sustainable pace than in the past. Here we avoid considering the amount of the advance in share values, which contain a factor of the rise in commodity prices or the depreciation in the value of the dollar.

Instead, we have been thinking lately that the country has reached a position of maturity, and this does not seem to conform with the showing of the stock market advancing two-thirds of the time in the last 14 years, against less than one-third of the time 14 years earlier, or less than one-half the time 14 years earlier still. Such apparent inconsistencies sometimes point the way to the truth.

One must grant the maturity, at least in a relative sense. In maturity, then, one knows better what he can do, he can have more confidence in his future. There would have been more bull markets in the past if there had been assurance that the current earnings were to be continued, for there were larger yields in much of the past. In maturity there is less likelihood of sweeping changes. We do not need to fear that steel will be replaced by some other metal. If radio is to be succeeded by something better, the idea is that the radio companies themselves will be the ones to find it.

By no means, however, should anyone dismiss the idea that the present bull market may be a mistake. That term involves much latitude. Every bull market, right after its termination, has been considered a mistake, at least in part, but in the long run it proves otherwise. Here in the Cleveland Trust Company chart referred to we have share value records beginning with 1879. The bull market of 1892 failed to attain the 1882 height, while the depression of 1896 was below that of 1884, but there were falling commodity prices throughout the period and that must be allowed for. When this bull market ends it will look like a mistake but it will be only partly so unless commodity prices fall greatly, and the swing of the last few years does not appear to presage any marked change in the next few years.

### Association Market Stabilizers

**F**ALLING into line with the practice in several other basic industries, lead producers and consumers last week organized the Lead Industries Association. One of the objects is to collect and disseminate information regarding uses of lead and its products and to gather statistics on production, distribution and marketing.

About a year ago copper producers formed the Copper Institute, which supplements the valuable work of the Copper and Brass Research Association and of Copper Exporters, Inc. In recent months the American Zinc Institute started a new department, the collection of information as to the condition of forward orders on the books of producers. The net result of these activities on the copper and zinc markets has been greater stabilization, to the advantage of both producer and consumer. In lead similar results may be expected.

### Workers' Share in Compensation

**T**HE contributory principle is now generally accepted, in theory or in fact, in connection with most undertakings for the benefit of industrial employees. It is being applied rapidly to sick benefits, group life insurance, unemployment insurance and in old age pensions as distinguished from those pension plans in which workers are considered to have earned a pension by long and efficient service. The one universal exception is workmen's compensation. A movement is now under way to put this, too, on a contributory basis, compelling the employee to bear a portion of a cost now exclusively borne by the owners. To do so would be to amend the principle upon which compensation was based when it replaced employers' liability in the United States.

The proponents of the contributory plan were represented at the recent annual meeting of the National Associations of Manufacturers by Walter Linn, secretary of the Pennsylvania Self-Insurers Association, his address being entitled "The Pennsylvania Plan" because its inception was in the attempt to establish the principle by act of the Pennsylvania legislature in 1926, when the State's compensation laws were revised. In the course of his remarks Mr. Linn said:

It takes the worker out of the "gim-me" class and puts him into an insurance partnership with his employer. If he gets more, he has to pay more, and there is nothing like a personal re-

sponsibility of that sort to rationalize men's demands.

One of the attractive arguments for the plan is that it would give the employee a financial interest in reducing accidents and preventing malingering. The millions of dollars invested in safety appliances and in alterations or installation of more expensive equipment, to reduce the hazards of employment, were justified to many a corporation by the dollars and cents savings to be effected. There would appear to be grounds for the assertion that, if the workman were given the same financial interest in seeing to it that fellow workmen observed safety regulations, the psychological influence would immediately reflect itself in further and marked reductions in accident severity and frequency.

Mr. Linn's stand is not shared by most employers of labor. It does not take into account that when compensation was established to replace employer's liability it was agreed that the worker gave as his contribution a certain amount of sacrifice of benefits which were his under the old law.

Employers' liability had worked out badly. At times the employee suffered injustice, at other times the employer had to pay damages all out of proportion to the injury. The shyster doctor and lawyer were much in evidence. The fellow-servant clause rid owners of

liability where an accident to one employee was due to the negligence of another employee. One great accident might bring ruin to an owner when a group of victims received over-generous damages from a sympathetic jury. It was not good business from any point of view. An unknown quantity was always present in estimates of production costs.

Quite naturally when workmen's compensation came over from England it was quickly accepted. The gambling element of accident was eliminated. Compensation for the employee was sure for every bona fide injury. Accident expense became a fixed cost to the employer. The theory was established that the worker's share in the cost was his sacrifice of certain former advantages.

Everything in connection with the system has worked nicely. Few complaints have been heard from the employee class. Owners have found the cost a none too heavy burden. Apace with the operation of the act has proceeded a prodigious work in the reduction of accident hazard. The inevitable result has been an amazing decrease in number and seriousness of accidents. We wonder if a survey of the manufacturers of America would not find probably relatively few firms which would urge that their employees share in the cost of compensation.

### Statistical Abstract of the United States

IN annual publications such as the Statistical Abstract of the United States, of which the fiftieth edition, 1928, has come to hand, each succeeding volume is nearly like those which have gone immediately before. Each new volume, however, is of increasing value, as it brings data more closely up to date, and shows us, when we study its contents, how we are progressing, both as to quantity and as to direction.

In the present edition are 842 pages consisting almost wholly of tabular matter, well indexed, and appertaining mainly to the physical characteristics of the United States and its people and their activities. Commerce, finance, agriculture, mining, forestry, fisheries, manufactures and many other topics in great profusion are treated, besides the usual figures for area, population, immigration and vital statistics.

### Standards for Compressed Air and Hydraulic Work

BOTH the Hydraulic Society and the Compressed Air Society have issued books of standards covering not only the technical definitions and standard practices relating to their respective fields, but also, in each case, a set of 15 principles of business conduct approved by the two societies, and identical in form.

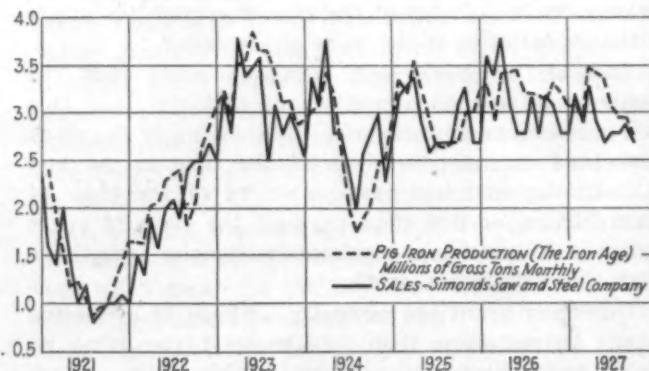
The Hydraulic Society is a trade association comprising the principal manufacturers of displacement and centrifugal pumps in the United States. It cooperates with the Department of Commerce, United States Chamber of Commerce, American Society of Mechanical Engineers, American Mining Congress, National Fire Prevention Association, the trade associations of other industries and other technical and commercial organizations with which the pump industry has problems in common. Its Book of Standards is of 78 pages, illustrated with both line cuts and half-tones, and carries some tabular matter and a great mass of data for the use of those interested in pump equipment.

Similar material is comprised within the 48 pages of

the Standards Book of the Compressed Air Society, this being material specific to the use of compressed air and to the equipment by which that use is carried out. The members of this society are fifteen of the leading companies making equipment for this purpose. The secretary of both societies is C. H. Rohrbach, 90 West Street, New York.

### Pig Iron Output in Close Correlation with Manufacturers' Sales

CLOSE correlation between the country's monthly production of pig iron, in tons, and monthly sales, in dollars, of the Simonds Saw & Steel Co., Fitchburg, Mass., is shown in the chart, which appears in "The American Way to Prosperity," by Gifford K. Simonds, general manager, and John G. Thompson, assistant to the president of



Showing Close Parallelism Between Pig Iron Output and Simonds Sales

the Simonds company. The book, which is just off the press, is published by the A. W. Shaw Co., Chicago.

Neither of the curves shown in the graph is adjusted for long-time trend or seasonal trend.

A chapter on "Forecasting" gives many of the details of the system of forecasting used by the Simonds company.



## Cast Iron Discussed by British Metallurgist

ONE of the last lectures delivered by Dr. W. H. Hatfield of Sheffield, England, on his recent tour of American metallurgical centers, was on "Cast Iron" before a joint meeting of the Boston chapter of the American Society for Steel Treating and the New England Foundrymen's Association at the Massachusetts Institute of Technology on Friday evening, Nov. 9.

The meeting was well attended, preceded by a dinner at which 75 were present. Doctor Hatfield had with him the 1928 edition of his book, "Cast Iron in the Light of Modern Research," and used this as a text for his talk which was quite informal.

First he outlined the work of the Cast Iron Research Association, which is a British institution supported by funds from the industry and from an equal contribution directly from the British Government. The affairs of the association are handled by a council made up of properly qualified men in this industry. It carries out research at Birmingham of a fundamental nature covering the metallurgy of cast iron. It also does a great deal of work in disseminating the existing knowledge regarding foundry problems and the metallurgy of cast iron. This is sent to contributing members in the form of bulletins. Also it answers any questions sent in by members and carries out at the foundries themselves research of a practical nature leading to the solving of foundry problems.

He next very briefly dealt with the addition of special alloys to cast iron and pointed out that cast iron would probably always find a large field of usefulness because of its lower melting point compared with steel. He next outlined his theory in regard to the freezing of cast iron, the separation of graphite and the final decomposition of the austenitic ground mass and pointed out briefly the influence of silicon in this mechanism of freezing. This was handled in a sensible and non-technical manner following the lines of the chapter in his book and was well received by his audience.

The lecturer next briefly referred to pearlitic cast iron, pointing out how narrowly the needed factors had to be followed and reminding us that this method was not for the jobbing foundry but might attain importance for the foundry specializing on particular work. Reference was then made to the growth of cast iron, his view of this subject being that it was intimately connected with the presence of graphite flakes in the metal, so that to prevent growth, iron should be used

which had fairly low silicon, a low total carbon, and possibly a little chromium added so as to give a suitable stable carbide. Emphasis should be laid on the complete stoppage of any graphite formation.

The lecture was followed by an animated and interesting discussion, most attention being given to semi-steel, to iron for special abrasive purposes, and to the influence of nickel on cast iron.

## Princeton Engineering Building Dedicated

The new engineering building at Princeton University, Princeton, N. J., was dedicated on Nov. 15 with appropriate ceremonies, which were attended by more than 200 engineers, including representatives of 38 technical and engineering schools. The building, which cost \$500,000, will enable the university's engineering school to be greatly expanded, and new curricula will be introduced. Among the speakers at the exercises were Carleton S. Proctor, of the engineering firm of Moran, Maurice & Proctor, New York, and president of the Princeton Engineering Association; Dexter S. Kimball, dean of the school of engineering, Cornell University, and Matthew S. Sloan, president of the New York Edison Co., New York.

## American Mining Congress To Meet in Washington

WASHINGTON, Nov. 16.—Rounding out nearly a third of a century of activity, the American Mining Congress will hold its thirty-first annual convention at the Mayflower Hotel in this city Dec. 5 to 8. The convention will draw to Washington the leaders in all branches of the mining industry. Governors of States having important mining interests will send official delegates, and representatives of various Government departments having contact with the industry will attend and participate in a discussion of pending mining issues.

The enlarged use of machinery in industry will occupy considerable attention by the convention. Meetings will be held of the boards of directors of the American Mining Congress, and of its Western, Southern and manufacturers' divisions. J. G. Bradley of Dundon, W. Va., president of the Elk River Coal & Lumber Co., will open the convention as president of the congress with an address on the organization as the "Clearing House for Mining." S. L. Mather of Cleveland, president of the Cleveland-Cliffs Iron

Co., will speak on the iron industry. Sidney J. Jennings of New York, president of the United States Smelting, Mining & Refining Co. and a former president of the American Mining Congress, will preside at one of the sessions and speak on the mining industry. "The Future of Copper" will be discussed by C. F. Kelley of New York, president of the Anaconda Copper Mining Co.

Canadian mining officials and operators are being extended a special invitation to attend the convention.

## Lead Companies Form an Institute

Representatives of 34 companies which produce or consume lead organized the Lead Industries Institute at a meeting at the Hotel Roosevelt in New York last week. The new organization will follow closely the lines of similar associations in other industries, such as the American Iron and Steel Institute, the American Zinc Institute and the Copper Institute. Membership will comprise every large factor in the industry in the United States, Mexico, Canada and South America. Mutual protection, the dissemination of accurate information regarding the uses of lead and its products, and the collection of statistics on production, distribution and marketing are three of the main objects of the new institute.

Clinton H. Crane, president Saint Joseph Lead Co., was chosen president, with Hamilton M. Brush, general sales agent American Smelting & Refining Co., and Ralph M. Roosevelt, vice-president Eagle-Picher Lead Co., vice-presidents, and Felix E. Wormser, secretary and treasurer, all of New York. Headquarters have not yet been selected.

## Consulting Chemists Form Association

The Association of Consulting Chemists and Chemical Engineers has been organized. Every member on joining "shall refrain from associating with or allowing the use of his name by any enterprise of questionable character. If in his opinion work requested of him by clients seems to present improbability of successful results, he shall so advise before undertaking the work."

The following are the officers: President, Hal T. Beans, Columbia University; vice-president, Irving Hochstadter, Hochstadter Laboratories; secretary, Clarence V. Ekroth, Ekroth Laboratories, 461 Eighth Avenue, New York; and treasurer, Jerome Alexander.

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*Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Nov. 29—Activity in Steel Consuming Industries; Dec. 20—Position of Iron and Steel Producers.*

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# Iron and Steel Markets

## Decline in Specifying Checked

Heavier Shipping Orders from Automotive Industry — First  
Quarter Contracting Under Way in Sheets  
and Strips—Tin Plate Advanced

**S**TEEL output has shown a further decline, but the recession in specifications has been checked and a buying movement for the first quarter is getting under way. Finished steel prices, for the most part, remain buoyant, as evidenced by advances during the week of \$2 a ton on tin plate and tin mill black plate.

In pig iron, also, sustained market activity is indicated in most districts. In the Central West, forward contracting is extending into the second quarter of next year, and at Birmingham prices have gone up 25c. a ton.

Scrap is again notable for its contrary trend. Heavy melting scrap at Pittsburgh has declined to \$17 a ton, or \$1 below the level of four weeks ago.

Steel ingot production in the Greater Pittsburgh district now averages 80 per cent, compared with 85 per cent last week. At Chicago, output has declined to 82 per cent, largely as a result of the annual overhauling of rail mills. Similar work is being done at the Alabama rail mill, which is scheduled to resume operations Nov. 24. The rate of steel ingot output for Steel Corporation subsidiaries is 80 per cent for the second week.

Specifications for finished steel at Chicago were the largest since February, but new business is small, possibly reflecting a desire to keep stocks down preparatory to inventory taking. Cleveland, however, reports not only heavier shipping orders, but a good volume of first quarter contracting in alloy steel bars, sheets and strips.

The automotive industry, which accounted in large part for the recent decline in specifications, is conspicuous in contributing to the current recovery. It is also supplying the chief impetus to first quarter buying. In fact, parts makers that use steel bars are anxious to have prices named for next quarter for use in figuring on contracts with motor car builders.

The failure of mills to announce first quarter quotations on bars, plates and shapes is interpreted, in some quarters, as reflecting uncertainty regarding the success of an advance, in view of the seasonal decline in the demand for those commodities. On the other hand, the recent advance of \$2 a ton on sheets has been adopted by nearly all mills, and some first quarter business, notably in body sheets, has been booked at the new prices.

The rise of 10c. per base box in tin plate, to apply on contracts for the first quarter and first half of 1929, was contrary to expectations. It had been believed that the base price would be left unchanged and the cash discount reduced to ½ per cent. Under that plan the

mills would have netted only slightly less than with the advance and the unchanged discount.

Alloy steel bar prices now generally range from 2.65c. to 2.75c., base mill. The lower price is \$2 a ton below the last advance, which apparently failed to apply on much tonnage business.

A high rate of construction is indicated by fabricated steel awards of 47,300 tons, following a total of 55,000 tons in the previous week. The oil industry contributed one letting of 12,000 tons of storage tanks, besides miscellaneous orders (not included in the total) aggregating 10,000 tons. The gas pipe line from Tulsa, Okla., to Lockport, Ill., sponsored by the Texas Corporation and the Empire Gas & Fuel Co., will take a total of 76,528 tons, which has been divided between a Milwaukee and a Pittsburgh mill instead of being placed at Youngstown, as previously reported.

Railroad buying of the week includes the placing of 10,000 tons of rails by the Missouri-Kansas-Texas and the distribution of 800 freight cars. The Chicago & North Western is in the market for 30,000 tons of rails, and the Wabash will buy 55 locomotives.

Sales of foundry grades of pig iron by Cleveland producers, at 52,000 tons, were nearly as large as a week ago. Continued pressure for iron is evident in other districts, notably at St. Louis and Chicago. Malleable pig iron at St. Louis has been advanced 50c. a ton, and another rise of \$1 a ton in the Chicago market is regarded as an early possibility. The 25c. a ton advance at Birmingham is expected to be followed by another of 50c. In the Valleys, where the scarcity of pig iron has been relieved by the reduced needs of steel works, producers have not succeeded in raising the market to the higher quotations recently announced.

Jackson County makers of silvery pig iron and Bessemer ferrosilicon have increased prices \$2 a ton.

Structural steel lettings in October (computed) totaled 240,000 tons, compared with 319,000 tons in September.

The European steel market, especially in semi-finished and light-weight material, is moderately active because of the German lockout. Our London cable, however, reports diminishing concern over German developments, with prices easing on the Continent.

Another slight rise in THE IRON AGE composite price for pig iron, the tenth in three months, brings it to \$18.54 a gross ton, against \$18.50 last week and \$17.63 a year ago. Finished steel remains at 2.369c. a lb.



## A Comparison of Prices

**Advances Over the Previous Week in Heavy Type, Declines in Italics**  
**At Date, One Week, One Month, and One Year Previous**

Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,	
Per Gross Ton:		Per Gross Ton:		Per Lb. to Large Buyers:	
1928	1928	1928	1927	1928	1927
Cents	Cents	Cents	Cents	Cents	Cents
No. 2 foundry, Philadelphia.....	\$21.26	\$21.26	\$20.76	\$19.76	
No. 2, Valley furnace.....	17.50	17.50	17.00	17.50	
No. 2, Southern, Cin'ti.....	20.19	19.94	19.94	19.69	
No. 2, Birmingham.....	16.50	16.25	16.25	16.00	
No. 2 foundry, Chicago*.....	20.00	20.00	19.00	18.50	
Basic, del'd eastern Pa.....	19.75	19.75	19.75	19.50	
Basic, Valley furnace.....	17.50	17.50	17.00	17.00	
Valley Bessemer, del'd P'gh.....	20.01	20.01	19.26	19.76	
Malleable, Chicago*.....	20.00	20.00	19.00	18.50	
Malleable, Valley.....	18.25	18.25	17.50	17.50	
Gray forge, Pittsburgh.....	18.76	18.76	18.26	18.76	
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04	
Ferromanganese, furnace.....	105.00	105.00	105.00	90.00	

Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,	
Per Gross Ton:		Per Gross Ton:		Per Lb. to Large Buyers:	
1928	1928	1928	1927	1928	1927
Cents	Cents	Cents	Cents	Cents	Cents
O.-h. rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00	
Light rails at mill.....	36.00	36.00	36.00	36.00	
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00	
O.-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00	
O.-h. sheet bars, P'gh.....	33.00	33.00	33.00	34.00	
Forging billets, P'gh.....	38.00	38.00	38.00	38.00	
O.-h. billets, Phila.....	38.30	38.30	37.30	38.30	
Wire rods, Pittsburgh.....	42.00	42.00	42.00	40.00	
	Cents	Cents	Cents	Cents	
Skelp, grvd. steel, P'gh, lb....	1.90	1.90	1.90	1.80	

Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,	
Per Lb. to Large Buyers:		Per Lb. to Large Buyers:		Per Lb. to Large Buyers:	
1928	1928	1928	1927	1928	1927
Cents	Cents	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12	
Iron bars, Chicago.....	2.00	2.00	2.00	1.90	
Steel bars, Pittsburgh.....	1.95	1.95	1.90	1.80	
Steel bars, Chicago.....	2.00	2.00	2.00	1.90	
Steel bars, New York.....	2.29	2.29	2.24	2.14	
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.80	
Tank plates, Chicago.....	2.00	2.00	2.00	1.90	
Tank plates, New York.....	2.22½	2.22½	2.22½	2.14	
Beams, Pittsburgh.....	1.90	1.90	1.90	1.80	
Beams, Chicago.....	2.00	2.00	2.00	1.90	
Beams, New York.....	2.19½	2.19½	2.19½	2.14	
Steel hoops, Pittsburgh.....	2.20	2.20	2.20	2.30	

Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,	
Per Lb. to Large Buyers:		Per Lb. to Large Buyers:		Per Lb. to Large Buyers:	
1928	1928	1928	1927	1928	1927
Cents	Cents	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh....	2.75	2.75	2.75	2.75	
Sheets, black, No. 24, Chicago					
dist. mill.....	2.85	2.85	2.85	2.90	
Sheets, galv., No. 24, P'gh....	3.50	3.50	3.50	3.65	
Sheets, galv., No. 24, Chicago					
dist. mill.....	3.60	3.60	3.60	3.75	
Sheets, blue, 9 & 10, P'gh....	2.00	2.00	2.00	2.10	
Sheets, blue, 9 & 10, Chicago					
dist. mill.....	2.10	2.10	2.10	2.20	
Wire nails, Pittsburgh.....	2.55	2.55	2.55	2.50	
Wire nails, Chicago dist. mill..	2.60	2.60	2.60	2.55	
Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40	
Plain wire, Chicago dist. mill..	2.45	2.45	2.45	2.45	
Barbed wire, galv., Pittsburgh	3.20	3.20	3.20	3.20	
Barbed wire, galv., Chicago					
dist. mill.....	3.25	3.25	3.25	3.25	
Tin plate, 100 lb. box, P'gh....	\$5.25	\$5.25	\$5.25	\$5.50	

Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,	
Per Gross Ton:		Per Gross Ton:		Per Lb. to Large Buyers:	
1928	1928	1928	1927	1928	1927
Cents	Cents	Cents	Cents	Cents	Cents
Heavy melting steel, P'gh.....	\$17.00	\$17.25	\$18.00	\$14.25	
Heavy melting steel, Phila.....	15.50	15.50	16.00	13.50	
Heavy melting steel, Ch'go....	14.50	14.50	14.00	11.50	
Carwheels, Chicago.....	14.25	14.25	13.75	13.25	
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50	
No. 1 cast, Pittsburgh.....	14.50	15.50	15.50	14.25	
No. 1 cast, Philadelphia.....	16.25	16.25	17.00	16.00	
No. 1 cast, Ch'go (net ton)....	15.50	15.50	15.50	13.50	
No. 1 RR. wrot., Phila.....	15.50	15.50	15.50	15.25	
No. 1 RR. wrot., Ch'go (net)..	13.00	13.00	12.75	9.50	

Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,	
Per Net Ton at Oven:		Per Net Ton at Oven:		Per Lb. to Large Buyers:	
1928	1928	1928	1927	1928	1927
Cents	Cents	Cents	Cents	Cents	Cents
Furnace coke, prompt.....	\$2.85	\$2.85	\$2.90	\$2.75	
Foundry coke, prompt.....	3.75	3.75	3.75	3.75	

Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,		Nov. 20, Nov. 13, Oct. 23, Nov. 22,	
Per Lb. to Large Buyers:		Per Lb. to Large Buyers:		Per Lb. to Large Buyers:	
1928	1928	1928	1927	1928	1927
Cents	Cents	Cents	Cents	Cents	Cents
Lake copper, New York.....	16.12½	16.12½	15.62½	13.75	
Electrolytic copper, refinery..	15.75	15.75	15.25	13.50	
Zinc, St. Louis.....	6.25	6.25	6.25	5.82½	
Zinc, New York.....	6.60	6.60	6.60	6.17½	
Lead, St. Louis.....	6.17½	6.20	6.32½	6.05	

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

# Pittsburgh

## Steel Business, After Slight Lull, Shows a Gain—Tin Plate Price Raised for First Half

PITTSBURGH, Nov. 20.—Steel business in the past week has shown some gain over that of the week before. While consumers still are governed in their purchases by known requirements and are influenced to some extent by the close proximity of the inventory period, the advances announced in sheets, which have had almost full subscription to by producers, and a belief that steel makers will seek higher prices on first quarter tonnages on a number of other finished products have tended to stimulate specifications on contracts for this quarter. Sheet business is notably better, and makers of strips find this month to be running well up to October in point of tonnage releases on contracts.

There has been a further recession in plant engagement in the Youngstown district and there is evidence here and in Wheeling and Johnstown that the necessity has gone by for producing ingots to the limit of capacity. The general average of ingot production of these districts now is about 80 per cent, which compares with 90 per cent a month ago, but stands out favorably with this time last year, when ingot output was not much above 60 per cent.

Announcement of the price of tin plate for the first half of next year has been followed by an expansion in orders and in mill operations, which had been somewhat checked by the lack of information respecting prices. The price was a surprise in view of the common expectation that any change would be in the discount for cash rather than in the base price.

In leaving the cash discount at 2 per cent and raising the base price to produce as much of a return as would have resulted from a lower discount, the mills have partly opened the question of the discount on sheets, as sheet jobbers, in protesting the reduction in the discount on sheets, advanced the suggestion that the price be raised and the discount be allowed

to remain at 2 per cent. The dominating consideration probably is found in the fact that advances have been better held in tin plate than in sheets.

A local maker of seamless pipe shares in a line pipe order recently closed requiring in all nearly 78,000 tons. Pipe makers feel pretty cheerful about the oil country pipe requirements for next year.

Dealings in pig iron confirm the impression held by buyers that producers had higher price ideas than they could realize. Basic iron again has been sold at \$17.50, Valley furnace, in the face of \$18 asked. Another drop of 25c. a ton on heavy melting scrap means that this material has gone down \$1 a ton, in four weeks.

**Pig Iron.**—An Alliance, Ohio, melter has closed for 5000 tons of basic iron for first quarter delivery at \$17.50, Valley furnace, the business being divided among three producers. This transaction clarifies the price of that grade, on which the common quotation recently was \$18, Valley furnace. No important sale of this grade has been made at more than \$17.50, Valley furnaces, and that price now appears to be as high as can be done in view of the fact that steel companies, which recently had none for sale, now

appear to have some available for the market. A merchant furnace, which will start up about the middle of next month, will make basic in addition to foundry and malleable iron. Fair-sized tonnages of foundry iron, including some of 1000 tons or more, have been sold for first quarter shipment at \$18, Valley furnace, for No. 2 grade, but the purchases were entirely by melters west of the Valleys and the freight rates to their plants are well under those to the Pittsburgh district. Delivered prices in most cases would work back to approximately \$17.50, Valley furnace, if the delivery were to this district, and, indeed, that price actually continues to be made on business in this district. Bessemer and malleable iron hold at the prices of a week ago, but with sales mostly in small lots. Some large users of foundry iron in this area are melting rather moderately, and one very large consumer reports that present supplies will last well through January. Asking prices on iron generally have been a little higher than consumers have been willing to pay or have been obliged to pay when they were able to offer attractive tonnages.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50 to \$18.00
Bessemer	18.25 to 18.50
Gray forge	17.00 to 17.50
No. 2 foundry	17.50 to 18.00
No. 3 foundry	17.00 to 17.50
Malleable	18.25 to 18.50
Low phos., copper free	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

**Semi-Finished Steel.**—Specifications for billets, slabs and sheet bars on fourth quarter contracts continue heavy, but new business does not amount to much, as non-integrated manufacturers do not find it necessary to supplement contract deliveries and it is a little early for them to be interested in first quarter requirements. For the latter delivery the mills are asking \$34, Pittsburgh or Youngstown, for sheet bars, an advance of \$1 a ton, but are holding to the present price of \$33 for large billets and slabs. Wire rods are firm at \$42, base Pittsburgh or Cleveland. There is talk of higher prices for nails

and wire and, if they come, an advance on rods is a likelihood.

**Bars, Plates and Shapes.**—Business is rather slow, particularly in comparison with the record for October. Those who buy bars for further manufacture are not doing as well as they did a few weeks ago and consequently are sparing in ordering shipments on contracts. Demand for merchant bars is steady and reinforcing bars are moving well, although individual sales and specifications are small. While the inquiry for fabricated steel is brisk, actual awards of size are few. Plate fabricating shops are not especially busy. Views as to first quarter bar, plate and shape prices are mixed. There is a belief in some quarters that an advance might encounter some difficulty in face of the seasonal decline in demand and the fact that considerable fourth quarter contract tonnage written mostly at 1.90c., base, remains to be specified. On the other hand, a single price basis is getting serious consideration and that would mean higher prices on much tonnage through a reduction or an elimination of the preferred buyers. The essential change in the market as compared with October is that fairly prompt deliveries are promised on all three products.

**Rails and Track Supplies.**—The New York Central Lines will open bids Nov. 27 on the tie plates and spikes to go along with its recent standard-section rail orders. This is a Clayton Law inquiry. Railroads supplied with rails from Pittsburgh have placed their 1929 requirements, and the local rail mill is now understood to be sold up for a run of four months. Light-section rails are dull in keeping with the fact that the coal market is neither active nor profitable enough to sustain a very full operation of the mines. Spike prices show some irregularity, but those for rails and tie plates are steady.

**Wire Products.**—Business is as much as one-third below that of October, but is as good as usual at this time of the year, when inventory considerations influence purchases. Prices

are very steady. Manufacturers have not yet taken action on first quarter prices. A new sales method for woven wire fence, providing zone prices, is an early possibility.

**Tubular Goods.**—The pipe for a gas line to run from Tulsa, Okla., to Lockport, Ill., it develops, will be furnished by a Milwaukee and a local mill and not by Youngstown mills, as was at first reported. For this line, sponsored by the Texas Company and the Empire Gas & Fuel Co., the A. O. Smith Corporation, Milwaukee, will furnish 630 miles of 12½-in. pipe, or 71,528 net tons, while 100 miles of 6½-in., or 5000 tons, seamless pipe will be produced by Spang, Chalfant & Co. Pipe business generally is making a fairly good showing. While oil country requirements are no tax upon productive capacity, the demand for them is constant and standard-weight pipe is doing as well as it ever does at this time of year.

**Sheets.**—With the announcement late last week by the American Sheet & Tin Plate Co. of an advance of \$2 a ton in prices, to 2.85c., base Pittsburgh, for black; 3.60c., base, for galvanized; 2.10c., base, for blue annealed; 4.10c., base, for automobile body sheets, and 3c., base, for tin mill black plate, mills representing most of the productive capacity of the country now are quoting these prices. Some business for January and February shipments has been booked at the new levels, but dependence for mill schedules still is upon specifications on fourth quarter contracts and these are reported to be coming along in good volume, considering the lighter requirements of the motor car builders and the close proximity of the end of the year, which usually means some contraction in tonnage releases.

**Tin Plate.**—There has been a substantial quickening in demand and mill operations since the announcement of the American Sheet & Tin Plate Co. on Nov. 15 of the new prices to rule on contracts for the first quarter and half of next year. The announcement was quite contrary to expectations in that the base price was

## THE IRON AGE Composite Prices

### Finished Steel

Nov. 20, 1928, 2.369c. a Lb.

One week ago	2.369c.
One month ago	2.362c.
One year ago	2.307c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.369c.	Oct. 30	2.314c.	Jan. 3
1927	2.453c.	Jan. 4	2.293c.	Oct. 25
1926	2.453c.	Jan. 5	2.403c.	May 18
1925	2.560c.	Jan. 6	2.396c.	Aug. 18
1924	2.789c.	Jan. 15	2.460c.	Oct. 14
1923	2.824c.	Apr. 24	2.446c.	Jan. 2

### Pig Iron

Nov. 20, 1928, \$18.54 a Gross Ton

One week ago	\$18.50
One month ago	17.92
One year ago	17.63
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$18.54	Nov. 20	\$17.04	July 24
1927	19.71	Jan. 4	17.54	Nov. 1
1926	21.54	Jan. 5	19.46	July 13
1925	22.50	Jan. 13	18.96	July 7
1924	22.88	Feb. 26	19.21	Nov. 3
1923	30.86	Mar. 20	20.77	Nov. 20



# Mill Prices of Finished Iron and Steel Products

## Iron and Steel Bars

### Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
Del'd Philadelphia.....	2.27c. to 2.32c.
Del'd New York.....	2.29c. to 2.34c.
Del'd Cleveland.....	1.92½c. to 2.05c.
F.o.b. Cleveland.....	1.95c. to 2.05c.
F.o.b. Lackawanna.....	2.05c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

### Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham.....	2.15c.

### Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c.
F.o.b. Chicago Heights mill.....	1.95c.

### Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

## Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.15c. to 2.25c.
F.o.b. Coatesville.....	2.05c. to 2.15c.
F.o.b. Sparrows Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

## Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.09c. to 2.19c.
Del'd Philadelphia.....	2.11c. to 2.21c.
Del'd New York.....	2.19½c. to 2.29½c.
C.i.f. Pacific ports.....	2.35c.

## Hot-Rolled Flats (Hoops, Bands and Strips)

	Base per Lb.
6 in. and narrower, P'gh.....	2.00c.
Wider than 6 in., P'gh.....	1.90c.
6 in. and narrower, Chicago.....	2.10c.
Wider than 6 in., Chicago.....	2.00c.
Cooperage stock, P'gh.....	2.10c.
Cooperage stock, Chicago.....	2.20c.

## Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	*2.55c. to 3.50c.
Strips, P'gh.....	2.85c.
Strips, Cleveland.....	2.85c. to 2.95c.
Strips, del'd Chicago.....	3.15c. to 3.25c.
Strips, Worcester.....	3.00c.
Fender stock, Pittsburgh or Cleveland.....	4.25c.

\*According to size.

## Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base per Keg
Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

	Base per 100 Lb.
Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

## Cut Nails

	Per 100 Lb.
Carloads, Wheeling, W. Va., or Reading, Pa. ....	\$2.75
Less carloads, Wheeling or Reading.....	2.85

## Woven Wire Fence

### Base to Retailers per Net Ton

F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

## Sheets

### Blue Annealed

	Base per Lb.
Nos. 9 and 10, f.o.b. P'gh.....	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.10c. to 2.20c.
Nos. 9 and 10, del'd Cleveland.....	2.19c. to 2.29c.
Nos. 9 and 10, del'd Philadelphia.....	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.15c.

### Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c. to 2.85c.
No. 24, f.o.b. Chicago dist. mill.....	2.85c. to 2.95c.
No. 24, del'd Cleveland.....	2.94c. to 3.04c.
No. 24, del'd Philadelphia.....	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham.....	2.90c.

### Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	3.90c. to 4.00c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.70c. to 3.80c.

### Galvanized

No. 24, f.o.b. Pittsburgh.....	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.69c. to 3.79c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.65c. to 3.70c.

### Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c.

### Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c. to 4.10c.
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### Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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### Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
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## Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

## Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

## Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.	Alloy	Net
S.A.E. Series	Differ-	Price 100
Numbers	ential	Lb. Bars
2000 (¼% Nickel).....	\$0.25	\$3.00
2100 (1½% Nickel).....	0.55	3.30
2300 (3½% Nickel).....	1.50	4.25
2500 (5% Nickel).....	2.25	5.00
3100 Nickel Chromium.....	0.55	3.30
3200 Nickel Chromium.....	1.35	4.10
3300 Nickel Chromium.....	3.80	6.55
3400 Nickel Chromium.....	3.20	5.95
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	3.25
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	3.45
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	3.80
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	3.10
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	3.20
5100 Chromium Spring Steel.....	0.20	2.95
6100 Chromium Vanadium Bars.....	1.20	3.95
6100 Chromium Vanadium Spring Steel.....	0.95	3.70
9250 Silicon Manganese Spring Steel (flats).....	0.25	3.00
Rounds and squares.....	0.50	3.25
Chromium Nickel Vanadium.....	1.50	4.25
Carbon Vanadium.....	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

## Rails

	Per Gross Ton
Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

## Track Equipment

### Base per 100 Lb.

Spikes, 9/16 in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15
Angle bars.....	2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

## Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

### Butt Weld

Inches	Steel	Galv.	Inches	Iron	Black	Galv.
1/8.....	45	19½	1/4 to 3/8.....	+11	+39	
1/4 to 3/8.....	51	25½	1/2.....	22	2	
1/2.....	56	42½	3/4.....	28	11	
3/4.....	60	48½	1 to 1½.....	30	13	
1 to 3.....	62	50½				

### Lap Weld

2.....	55	43½	2.....	23	7
2½ to 6.....	59	47½	2½.....	26	11
7 and 8.....	56	43½	3 to 6.....	28	13
9 and 10.....	54	42½	7 to 12.....	26	11
11 and 12.....	53	40½			

### Butt Weld, extra strong, plain ends

1/8.....	41	24½	1/4 to 3/8.....	+19	+54
1/4 to 3/8.....	47	30½	1/2.....	21	17
1/2.....	53	42½	3/4.....	28	12
3/4.....	58	47½	1 to 1½.....	30	14
1 to 1½.....	60	49½			
2 to 3.....	61	50½			

### Lap Weld, extra strong, plain ends

2.....	53	42½	2.....	23	9
2½ to 6.....	57	46½	2½ to 4.....	29	15
4½ to 6.....	56	45½	4½ to 6.....	28	14
7 to 8.....	52	39½	7 to 8.....	21	7
9 and 10.....	45	32½	9 to 12.....	16	2
11 and 12.....	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

## Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27
2½ to 2¾ in.....	37
3 in.....	40
3¼ to 3½ in.....	42½
4 to 4½ in.....	46
5 to 6 in.....	40
1½ in.....	11½
2 to 2½ in.....	18
2½ to 3 in.....	8
3 to 3½ in.....	2
3½ to 4 in.....	7
4 to 4½ in.....	9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel	Charcoal Iron
Under 5000 lb.....	4 Fives
5000 lb. to 12,000 lb.....	5 Fives
12,000 lb. to 21,000 lb.....	6 Fives
21,000 lb. and over.....	7 Fives
	1 Ten
	2 Tens
	2 Tens & 2½
	2 Tens & 5

### Standard Commercial Seamless Boiler Tubes

#### Cold Drawn

1 in.....	63	3 in.....	48
1½ to 1¾ in.....	55	3½ to 3¾ in.....	50
1¾ in.....	39	4 in.....	53
2 to 2½ in.....	34	4½, 5 and 6 in.....	45
2½ to 2¾ in.....	42		

#### Hot Rolled

2 and 2½ in.....	40	3½ to 3¾ in.....	56
2½ and 2¾ in.....	48	4 in.....	59
3 in.....	54	4½, 5 and 6 in.....	48

Less carload, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

## Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

advanced 10c. per box and the discount for cash in 10 days allowed to remain at 2 per cent; it was commonly believed that the discount would be reduced to one-half of 1 per cent and that the base prices would remain at \$5.25, Pittsburgh, and \$5.35, Gary. The advance in the base prices to \$5.35, Pittsburgh, and \$5.45, Gary, gives the mills slightly more than they would have obtained by allowing the former prices to stand and to cut the discount.

**Cold-Finished Steel Bars and Shafting.**—Shipments on old orders or contracts are good, but new business is light and order books are dwindling. Sentiment still is divided as to first quarter prices. On account of the narrow spread between hot-rolled and cold-finished steel bar prices, many believe that the price should be advanced regardless of the first quarter hot-rolled bar prices, but others wait on the announcement of the first quarter hot-rolled bar price.

**Hot-Rolled Flats.**—Some strip makers find business somewhat under the October record, but others report orders and specifications to be running this month at substantially the same rate as last month. The need of orders is not urgent enough to cause the mills to take them except at full prices. The real test of the new prices and the card of extras is ahead, as large consumers have not yet started negotiations for first quarter tonnages.

**Cold-Rolled Strips.**—Business is holding up better than most makers expected it would. On new orders, 2.85c., base Pittsburgh, is well maintained, and small tonnages are being sold at as high as 2.95c., base. The bulk of the tonnage, however, is being shipped at this quarter's contract price of 2.75c., base.

**Coke and Coal.**—Offerings of spot coke, both furnace and foundry, still are ample for wants. Prices are no more than steady at last week's levels.

#### Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates .....	3.00c.
Structural shapes .....	3.00c.
Soft steel bars and small shapes ..	2.90c.
Reinforcing steel bars .....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons .....	3.60c.
Squares and flats .....	4.10c.
Bands .....	3.60c.
Hoops .....	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles .....	3.70c.
Galv. sheets (No. 24), 25 or more bundles .....	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets .....	3.35c.
Galv. corrug. sheets (No. 28), per square .....	\$4.43
Spikes, large .....	3.40c.
Small .....	3.80c. to 5.25c.
Boat .....	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb. ....	\$3.50
Wire, black soft ann'l'd, base per 100 lb. ....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb. ....	3.00 to 3.10
Common wire nails, per keg .....	3.00
Cement coated nails, per keg .....	3.05

The coal market is dull and very weak. With the Lake shipping season almost over, an outlet of size has been closed and there has not been a corresponding curtailment of production. The result is that buyers have much more to say as to prices than producers.

**Old Material.**—Heavy melting steel has been sold within the past week at \$17 for delivery to three points in the district. More seems impossible to obtain; dealers with short orders to cover report considerable difficulty in purchasing for less. Scrap rails and compressed sheets also command \$17 on sales into consumption. The market, as typified by heavy melting steel, has dropped an even dollar per ton from its peak of a month ago, but this decline seems to be more a case of deflation than of outright weakness, as supplies still are scant. Lower prices are noted on most grades in sympathy with heavy melting steel.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel .....	\$17.00
Scrap rails .....	17.00
Compressed sheet steel .....	17.00
Bundled sheets, sides and ends .....	\$15.50 to 16.00
Cast iron carwheels .....	15.00 to 15.50
Sheet bar crops, ordinary .....	17.00 to 17.50
Heavy breakable cast .....	13.50 to 14.00
No. 2 railroad wrought .....	17.00
Heavy steel axle turnings .....	15.00
Machine shop turnings .....	10.50 to 11.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers .....	18.50 to 19.00
Railr. coil and leaf springs .....	18.50 to 19.00
Roller steel wheels .....	18.50 to 19.00
Low phos. billet and bloom ends .....	20.50 to 21.00
Low phos., mill plates .....	19.00 to 19.50
Low phos., light grade .....	18.00 to 18.50
Low phos., sheet bar crops .....	19.00 to 19.50
Hvy. steel axle turnings .....	15.00
Electric Furnace Grades:	
Low phos. punchings .....	18.50 to 19.00
Hvy. steel axle turnings .....	15.00
Blast Furnace Grades:	
Short shoveling steel turnings .....	12.00 to 12.50
Short mixed borings and turnings .....	12.00 to 12.50
Cast iron borings .....	12.00 to 12.50
No. 2 bushing .....	9.50 to 10.00
Rolling Mill Grades:	
Steel car axles .....	20.00 to 21.00
No. 1 railroad wrought .....	13.00 to 13.50
Sheet bar crops .....	18.00 to 18.50
Cupola Grades:	
No. 1 cast .....	14.50 to 15.00
Rails 3 ft. and under .....	17.50 to 18.00

Edgar E. Brosius, Inc., engaged in designing and marketing steel plant and blast furnace equipment, no longer "farms" the manufacture of the various machines and equipment bearing the Brosius trademark to outside shops, but does this work in a plant of its own located in Sharpsburg, just outside the corporate limits of Pittsburgh. Among the Brosius products are a double barrel automatic clay gun for blast furnace plants, an automatic single hoist grab bucket for handling loose materials, such as cinder, coal and ashes, a single hook grab bucket, cinder notch stoppers, coke testing tumbling barrels, various types of charging machines, ash pit buckets, monorail bucket hoists, dump buckets, the wide opening scraper type grab buckets and crucible drawing and charging machines.

## First Boat Load of Steel Reaches Moline, Ill.

The first shipment of steel to pass through Moline, Ill., by boat since the Inland Waterway Corporation started operating went through the Moline locks Nov. 8. The barge, containing 385 tons of steel wire products, was forwarded by a Pittsburgh producer.

## Continuous Furnaces Have Soaking Chambers

Two triple fired continuous furnaces, built by the Rust Engineering Co., Pittsburgh, for the Timken Roller Bearing Co., at Canton, Ohio, have been put into operation. Each is designed to heat 40 tons of 18 ft. x 10 in. x 10-in. blooms per hour.

One of the features of these furnaces is an independently fired soaking chamber, through which the blooms pass just before being discharged. This soaking chamber is separately controlled from the rest of the furnace although built as part of it. Two sets of burners immediately behind the soaking chamber, fire above and beneath the blooms, and it is these burners which determine the tonnage output of the furnace, the soaking chamber being used as the name implies, to soak the blooms and equalize their temperature throughout.

## Wood Refuse as Fuel

Many plants which have a large amount of wood refuse from operations are utilizing this as a part of the fuel burned under boilers for producing steam. In some cases this is comminuted and then sent through suction pipes to hoppers over the boilers, which may be at a distant point. Other methods of handling are more or less widely used. In any case, however, the material usually is thrown into the furnace by means of pressure from behind or suction from the stack.

Considerable quantities of moisture usually are present in waste wood. Experiments have determined the remaining available heat in this material with varying contents of moisture. Based on 8700 B.t.u. for each pound of dry wood, with an assumed stack temperature of 560 deg., the heat available with wood containing 10 per cent moisture is about 7700 B.t.u. This quantity reduces by about 1000 B.t.u. for each addition of 10 per cent in the moisture.

Woods of various kinds have varying heating values when dry. Oak is given as 8316 B.t.u., while pine is listed as 9753 B.t.u. Ash, elm, beech, birch and fir are given intermediate grades, the ash being nearest to the oak. These thermal figures are taken from a pamphlet, "Burning Wood Refuse for Fuel," issued by the International Combustion Engineering Corporation, 201 Madison Avenue, New York.



# Semi-Finished Steel, Raw Materials, Bolts and Rivets

## Mill Prices of Semi-Finished Steel

### Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	\$33.00
Rerolling, 4 in. and under 10 in., Youngstown	33.00
Rerolling, 4 in. and under 10 in., Cleveland	\$33.00 to 34.00
Rerolling, 4 in. and under 10 in., Chicago	34.00 to 35.00
Forging quality, Pittsburgh	38.00

### Sheet Bars

	(Open hearth or Bessemer)	Per Gross Ton
Pittsburgh		\$33.00 to \$34.00
Youngstown		33.00 to 34.00
Cleveland		33.00 to 34.00

### Slabs

	(8 in. x 2 in. and under 10 in. x 10 in.)	Per Gross Ton
Pittsburgh		\$33.00
Youngstown		33.00
Cleveland		\$33.00 to 34.00

### Skelp

	(F.o.b. Pittsburgh or Youngstown)	Per Lb.
Grooved		1.90c. to 2.00c.
Universal		1.90c. to 2.00c.
Sheared		1.90c. to 2.00c.

### Wire Rods

	(Common soft, base)	Per Gross Ton
Pittsburgh		\$42.00
Cleveland		42.00
Chicago		43.00

## Prices of Raw Material

### Ores

	Lake Superior Ores, Delivered Lower Lake Ports	Per Gross Ton
Old range Bessemer, 51.50% iron		\$4.55
Old range non-Bessemer, 51.50% iron		4.40
Mesabi Bessemer, 51.50% iron		4.40
Mesabi non-Bessemer, 51.50% iron		4.25
High phosphorus, 51.50% iron		4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore		4.15
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian		10.00c.
Iron ore, Swedish, average 66% iron		9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus		38c.
Manganese ore, Brazilian, African or Indian, basic 50%		37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates		\$11.25 to \$11.50
Chrome ore, 45 to 50% Cr <sub>2</sub> O <sub>3</sub> , crude, c.i.f. Atlantic seaboard		\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS <sub>2</sub> , delivered		50c. to 55c.

### Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.85 to \$2.90
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

### Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 1/4-in., f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	60c. to 80c.
Gas slack, f.o.b. W. Pa. mines	90c. to 1.00

### Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

### Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$30.00 to \$33.00
Domestic, 16 to 19%	29.00 to 32.00

### Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
12%	\$39.00
14 to 16%	45.00

### Bessemer Ferrosilicon

	F.o.b. Jackson County, Ohio, Furnace	Per Gross Ton
10%		\$32.00
11%		34.00
12%		\$36.00

### Silvery Iron

	F.o.b. Jackson County, Ohio, Furnace	Per Gross Ton
6%		\$25.00
7%		26.00
8%		27.00
9%		28.00
10%		\$30.00
11%		32.00
12%		34.00

### Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	98c. to \$1.00
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	\$209.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	\$122.50

### Fluxes and Refractories

#### Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
No. 2 lump, Illinois and Kentucky mines	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines	32.50

#### Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heat Duty Brick
Pennsylvania ...	\$43.00 to \$46.00	\$35.00 to \$38.00
Maryland .....	43.00 to 46.00	35.00 to 38.00
New Jersey .....	50.00 to 65.00	.....
Ohio .....	43.00 to 46.00	35.00 to 38.00
Kentucky .....	43.00 to 46.00	35.00 to 38.00
Missouri .....	43.00 to 46.00	35.00 to 38.00
Illinois .....	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

#### Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	\$8.50 to 10.00

#### Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

#### Chrome Brick

	Per Net Ton
Standard size	\$45.00

## Mill Prices of Bolts, Nuts, Rivets and Set Screws

### Bolts and Nuts

	Per 100 Pieces
	(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)
	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

### Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2 1/2
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

### Large Rivets

	(1/2-In. and Larger)	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland		\$2.90
F.o.b. Chicago		3.00

### Small Rivets

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

### Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

## Chicago

### Heavy Specifications for Steel But New Buying is Light— Ingot Output Now at 82 Per Cent

CHICAGO, Nov. 20.—Large buyers in the Western steel market are inactive from the viewpoint of new purchases, but their shipping orders to cover nearby requirements have swelled total specifications for finished steel products to the largest volume since the third week in February. New orders are small, indicating the intention of users to take care of immediate needs only and to cut stocks to the minimum in anticipation of the year-end inventory period. A few buyers have stated their expected requirements for the first quarter in the new year.

Prices of plates, shapes and bars are firm at 2c. to 2.10c. per lb., and, as the circle of buyers at 2.10c. expands, producers to the east of Chicago find this territory a more fertile field for the sale of their products.

The number of furnaces in blast remains unchanged, but it is probable that an Inland stack, which is now being relined, will be blown in soon after Dec. 1. Steel mill pig iron production is a trifle in excess of finishing departments' demands, affording producers an opportunity to offer small lots to the merchant pig iron trade.

Rail mills, having completed the most urgent requests for immediate delivery, are operating at greatly reduced output while the mechanical equipment is being put in shape for the heavy winter and spring rolling schedules. Curtailment in rail production has brought down the rate of ingot output, the average now being about 82 per cent of capacity. Building operations in Illinois in October swung upward in contrast with the downward movement a year ago.

**Pig Iron.**—This market remains strong. Shipments of Northern iron are going forward in heavy total tonnage. Quotations for large tonnages are at \$20 a ton and scattered lots bring \$20.50. It is believed in some quarters that an advance to \$21 is an early possibility. A Chicago buyer is in the market for 5000 tons of basic iron for delivery east of here. A Wisconsin user has placed a round tonnage of malleable iron and another order is for 2000 tons. Several Northern iron purchases aggregate 4000 tons. Southern iron has been advanced 25c. to \$16.50 a ton, Birmingham. The charcoal iron market remains active, and prices are strong at \$24 a ton, furnace. The three producers have their four furnaces in blast and a shortage exists in several grades. Several brokers in Chicago have received notice that silvery iron is advanced \$2 a ton, bringing the 10 per cent grade to \$30 a ton, f.o.b. Jackson County, Ohio, furnace.

*Prices per gross ton at Chicago:*

N'th'n No. 2 fdy., sil. 1.75 to 2.25...	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75...	20.50
Malleable, not over 2.25 sil.....	20.00
High phosphorus .....	20.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	22.51
Low phos., sil. 1 to 2, copper free .....	\$29.00 to 29.50
Silvery, sil. 8 per cent.....	31.79
Bess. ferrosilicon, 14-15%.....	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

**Ferroalloys.**—Spiegeleisen is being

offered to local users in tonnage lots at \$31 a ton, Hazard, Pa., in the 19 to 21 per cent grade. The delivered price of \$83.50 a ton for ferrosilicon has not held on all 1929 contracts, cuts of \$2 to \$3 a ton having been made.

*Prices delivered Chicago:* 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$40.76.

**Plates.**—A Chicago fabricator has taken 12,000 tons of oil storage tank work for the Roxana Petroleum Corporation. The tanks are a part of a program of 130 to be erected by this oil company at Houston, Tex. In addition to the above tonnage, about 10,000 tons of tank plates has been ordered by miscellaneous users in the Southwest and on the Pacific Coast. Among fresh inquiries for railroad equipment are 500 underframes, 200 tank cars and 50 steel caboose cars. Greater activity in car shops is indicated by larger specifications for steel from that source. Average deliveries on plate mill products are about two weeks.

*Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago*

**Cast Iron Pipe.**—Marked improvement is noted in this market. Actual orders have not mounted to any extent, but definite and large-sized inquiry is in the making. Contractors have placed orders for a total of 5000 tons; railroads, gas companies and other miscellaneous users are ordering more liberal quantities. Many municipalities are taking prompt action on pipe covered by recent bond issues, and sellers expect that a number of actual inquiries will be before the trade by the turn of the year. Deliveries are prompt. Prices are steady at \$37 to \$38 a ton, Birmingham, for 6 in. and larger diameter pipe.

*Prices per net ton, deliv'd Chicago:* Water pipe, 6-in. and over, \$45.20 to \$46.20; 4-in., \$49.20 to \$50.20; Class A and gas pipe, \$4 extra.

**Bars.**—Demand for bar mill products is well sustained. Shipments of mild steel bars represent about 87 per cent of mill capacity. Both automobile and parts makers' needs are lower, but schedules that are now being arranged for deliveries in December give promise of heavier shipments to those users. The new six-cylinder Chevrolet car is in production and shipments of steel to that manufacturer are heavier. Needs of agricul-

tural machinery plants are larger than had been anticipated at the turn of the quarter and orders for fill-in tonnages are being placed with mills. Chicago prices for mild steel bars are stronger at 2c. to 2.10c. per lb. The iron bar market is quiet except for scattered orders from the railroads for immediate shipment. Shipments of alloy steel bars to automobile manufacturers are fully 30 per cent lower than at the turn of the month. Producers here have met this situation with a cut in operations to 75 per cent of capacity. Alloy quality bar base prices, f.o.b. makers' mills, are 2.65c. to 2.75c. per lb., depending on the character of orders. Prices for rail steel bars are strong; scattered sales have been made at 2.05c. per lb., Chicago Heights.

*Mill prices per lb.:* Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

**Structural Material.**—In the absence of large tonnage awards, this market is being supported by fabricators' needs for old orders. Specifications are heavy, considering the time of the year, and, for the most part, shops are well engaged and have sizable backlogs. It is reported that the Fine Arts Building, Chicago, requiring 5000 tons, will again be brought out for bids, and Dec. 1 is the date now set for opening bids on the 15,000 tons needed for the Chicago Board of Trade Building. Fresh inquiry is light, and bidding is keen, with resultant low prices. It is reported that an order will soon be placed for the 4000 tons required for the Northwestern National Bank Building at Minneapolis.

*Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.*

**Rails and Track Supplies.**—Rail purchases in the week have come from miscellaneous sources and aggregate a few thousand tons. Fresh inquiry for 40,000 tons includes 30,000 tons for the Chicago & North Western. The track accessory market is active, with sales of 15,000 tons and inquiries for 30,000 tons. The Missouri Pacific is in the market for 4,000,000 tie plates, of which 2,000,000 are to be of copper-bearing steel. Several round tonnages of iron tie plates are also being sought. Prices for tie plates are steady at Chicago at \$43 a ton, but to the south quotations are said to be lower than this figure. The light rail market is dull. Output of standard-section rails is sharply curtailed this week while producers attempt to put mills in condition for the winter and spring rolling schedules.

*Prices f.o.b. mill, per gross ton:* Standard-section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

**Sheets.**—Demand from most users has lessened. Based on present indications, hot mill output will drop below the current rate of 85 per cent of capacity by the end of this week. Barrel and light tank makers have entered their dull season and the roof-



ing trade has not come out of the slump experienced several weeks ago. Sellers report a favorable outlook for railroad car roof sheets, but this business is not expected to develop in volume before late winter or early spring. With the approach of the inventory season, there is the urge among consumers to hold stocks to a minimum; accordingly, current sales are light. First quarter business is developing slowly, with no sales reported, but inquiry is moderately active. Deliveries are somewhat improved, especially in the blue annealed product, which can be had in two weeks.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c. to 3.00c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'd, 2.15c. to 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

**Coke.**—Buyers of by-product foundry coke are actively seeking contracts for first half, but sellers have not opened their books for the new year. Prices are strong at \$8, local ovens, and \$8.75, delivered in the Chicago switching district.

**Bolts, Nuts and Rivets.**—Specifications from agricultural machinery manufacturers are unusually heavy and some improvement is seen in demands from the railroads. Several large users are taking smaller quantities, with the net result that output remains at 65 per cent of capacity.

**Reinforcing Bars.**—Although prices remain at the low levels of recent weeks, sellers are now disposed to quote higher. Local producers contemplate making a \$5 a ton extra charge on cut to length orders. This would bring the mill cut to length quotation to 2.35c. per lb. Mild steel bars out of Chicago warehouses are quoted 2.10c. per lb. Business during the week has been light.

**Cold-Rolled Strip.**—Books have been opened for first quarter at 2.85c. to 2.95c. per lb., Cleveland. The freight rate to Chicago is 30c. per 100 lb. New buying is light, but improvement is noted in specifications. Inquiry for future needs, especially by automobile manufacturers, is active.

**Cold-Finished Bars.**—Prices are firm at 2.20c. per lb., Chicago, for de-

livery during the remainder of this year. Sales are in fair volume and specifications are sustaining output at nearly local plant capacity.

**Wire Products.**—Purchases average well up to those of recent weeks and mill output is supported at 65 per cent of capacity. November shipments are running a trifle above the rate in October and decidedly better than in November, 1927. Demand for woven wire fencing continues dull and below seasonal expectations. Prices for nails are steady. The tonnage shipped in the first 10 months of this year was smaller than that shipped in the corresponding period of 1927. Current orders, although still small, show some improvement over the total for last week. Jobbers in the Northwest are rounding out stocks and are ordering more freely. The jobbing trade in the South is quiet, but it is more active in the Central West and in the East.

**Wire Rods.**—Specifications are for liberal quantities and current purchases for immediate delivery are in fair volume. Prices are firm at \$43 a gross ton, Chicago.

**Old Material.**—The Chicago scrap market is marking time, in the absence of movement of heavy tonnage grades, except as dealers trade against old orders. Brokers are paying \$14 to \$14.85 a gross ton, delivered, for heavy melting steel, in which grade orders were taken at \$14.50 to \$15. The supply is more than adequate to meet current requirements of buyers, and inspections are tightening, with the result that rejected scrap is quite troublesome. At a recent sale by the Chicago & Alton Railroad, heavy melting steel was bid in at \$15.10 a gross ton, delivered, indicating the lower range of prices that brokers are willing to pay at sources of supply. On the whole, consumption remains large and many dealers take this condition as an indication that prices in the next few weeks will not fluctuate over a wide range. Railroad shipments are coming out more slowly, deliveries now being 30 to 40 days, while at the turn of the month scrap appeared on track within a few days after it was sold. Cast iron borings are quiet except in dealer activity in covering old contracts. One

user has requested sellers to hold back shipments. Bad weather is hindering the preparation and loading of scrap in local yards. Electric furnace grades are moving in good volume and sales are active. Miscellaneous foundry grades are being taken in small lots for immediate consumption. Dealers no longer are having trouble in obtaining cars for scrap.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:

Heavy melting steel.....	\$14.50 to \$15.00
Shoveling steel.....	14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails	15.75 to 16.25
Hydraul. compressed sheets	12.50 to 13.00
Drop forge flashings.....	10.50 to 11.00
Forg'd, cast and r'l'd steel carwheels.....	17.75 to 18.25
Rail'd tires, charg. box size.....	17.50 to 18.00
Rail'd leaf spring cut apart.....	17.25 to 17.75

Acid Open-Hearth Grades:

Steel couplers and knuckles	16.00 to 16.50
Coil springs.....	18.25 to 18.75

Electric Furnace Grades:

Axle turnings.....	14.00 to 14.50
Low phos. punchings.....	16.25 to 16.75
Low phos. plate, 12 in. and under.....	16.00 to 16.50

Blast Furnace Grades:

Axle turnings.....	12.00 to 12.50
Cast iron borings.....	11.50 to 12.00
Short shoveling turnings..	11.50 to 12.00
Machine shop turnings.....	7.50 to 8.00

Rolling Mill Grades:

Iron rails.....	15.00 to 15.50
Rerolling rails.....	16.50 to 17.00

Cupola Grades:

Steel rails less than 3 ft..	17.50 to 18.00
Angle bars, steel.....	16.50 to 17.00
Cast iron carwheels.....	14.25 to 14.50

Malleable Grades:

Railroad.....	16.00 to 16.50
Agricultural.....	12.50 to 13.00

Miscellaneous:

*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav. ....	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:

Iron angles and splice bars	14.50 to 15.00
Iron arch bars and transoms.....	20.50 to 21.00
Iron car axles.....	26.50 to 27.00
Steel car axles.....	15.50 to 16.00
No. 1 railroad wrought..	13.00 to 13.50
No. 2 railroad wrought..	13.00 to 13.50
No. 1 busheling.....	11.50 to 12.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	13.25 to 13.75
Pipes and flues.....	9.50 to 10.00

Cupola Grades:

No. 1 machinery cast.....	15.50 to 16.00
No. 1 railroad cast.....	14.50 to 15.00
No. 1 agricultural cast.....	14.00 to 14.50
Stove plate.....	12.00 to 12.50
Grate bars.....	12.50 to 13.00
Brake shoes.....	11.50 to 12.00

\*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

## Warehouse Prices, f.o.b. Chicago

Base per Lb.

Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.10c. to 2.50c.
Reinforc'g bars, rail steel.....	1.85c. to 2.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands.....	3.65c.
Hoops.....	4.15c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.

Per Cent Off List

Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank..	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'd wire, per 100 lb..	\$3.30
Com. wire nails, base per keg.....	3.10
Cement c't'd nails, base per keg.....	3.10

## Steel Castings Orders Decline in October

WASHINGTON, Nov. 20.—Orders for commercial steel castings in October totaled 77,783 tons, or 54 per cent of the monthly capacity of the 129 manufacturers reporting to the Department of Commerce. Orders in September amounted to 82,329 tons, or 57 per cent of capacity. Production in October was 86,669 tons, or 60 per cent of capacity, against 75,356 tons, or 52 per cent of capacity, in September.

Of the October orders, 26,529 tons was for railroad specialties, being 39 per cent of that class of capacity;

while 51,254 tons was for miscellaneous castings, representing 67 per cent of that class of capacity. Of the October production, 29,113 tons was for railroad specialties, or 33 per cent of that class of capacity, and 57,556 tons was for miscellaneous castings, being 75 per cent of that class of capacity.

Orders for commercial castings for the 10 months ended with October totaled 814,571 tons, against 779,062 tons for the corresponding period of last year. Production during the 10 months of the current year aggregated 852,609 tons, compared with 847,386 tons for the corresponding period of last year.

# Philadelphia

## Steel Consumers Well Engaged and Specifying Freely —Jobbers Advance Sheets \$3 a Ton

PHILADELPHIA, Nov. 20.—First quarter buying of pig iron and steel is expected by most sellers to develop early next month, by which time it is believed that most consumers will be in a position to estimate their requirements for the period. Deliveries of steel on contracts are in good volume. Shipyards are quoting on more tonnage than for a number of years, local radio manufacturers are operating at a high rate and fabricating shops are expecting some substantial business for next year from the Reading Railroad electrification to be begun in the spring. Warehouses have advanced blue annealed, black and galvanized sheet prices \$3 a ton.

**Pig Iron.**—Only 20 to 25 per cent of the total tonnage of foundry iron required by consumers in this district for the next quarter is estimated to be under contract. Furnaces have backlogs sufficient to carry them into January. For delivery this year the market is firm at \$20.50 per ton, but the quotation of \$21 per ton for first quarter contracts has not yet been tested by the purchase of a substantial tonnage. Low phosphorus iron continues inactive in this district, but the price is firm. A large user of basic iron, which has been in the market for about 20,000 tons, is expected to buy this week.

### Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	21.26 to 21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X, 2.26 to 22.76	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.00
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

**Ferromanganese.**—Practically all the important consumers have contracted for next year with domestic producers at \$105 per ton, seaboard. British sellers report a few contracts for small tonnages.

**Bars.**—Mills have sufficient tonnage in sight or on order to carry them to the end of the year. Current contracts are at 1.90c. and 1.95c., Pittsburgh, but 2c., Pittsburgh, or 2.32c., Philadelphia, is being maintained on new business. Contracting for the next quarter has not yet begun.

**Shapes.**—Fabricating shops are busy and have some desirable business in prospect for next year. Shipbuilders are more active in bidding for contracts than for some time and are expected to provide a substantial tonnage of shape business next year. Prices are unchanged at 2.05c. per lb., f.o.b. nearest mill to consumer, or 2.11c., Philadelphia, based on Pen-coyd, Pa.

**Plates.**—Bids on four ships requiring 13,500 tons of plates to be built for the Export Steamship Corporation, New York, have been rejected, and it is understood that a new and slightly less elaborate specification is

to be prepared. The Pusey & Jones Corporation at Wilmington, Del., has contracts for three private yachts, about 236 ft. over all and a \$750,000 oil tanker for the Tidewater Oil Co. Plate prices continue at 2.05c. to 2.15c., Coatesville, or 2.15c. to 2.25c., Philadelphia, with most of the current buying of small lots at 2.10c., Coatesville.

**Sheets.**—Eastern Pennsylvania mills have advanced sheet prices \$2 a ton for delivery over the rest of this year and for first quarter. Prior to the increase, consumers were given an opportunity to place any additional requirements for the present quarter at the former prices, so no test of the new level is in prospect until first quarter contracting develops. The extra charge of 10c. per 100 lb. on blue annealed sheets 45 in. and wider has been eliminated with the advance to 2.10c., base Pittsburgh. Black sheets are quoted at 2.85c., Pittsburgh, or 3.17c., Philadelphia, and galvanized at 3.60c., Pittsburgh, or 3.92c., Philadelphia.

**Warehouse Business.**—To adjust their sheet prices to the new mill situation, jobbers have advanced black and galvanized sheets \$3 a ton to 4c. per lb. for black and 4.75c. per lb. for galvanized, effective Nov. 19, and have increased blue annealed to 3.15c. per lb., effective Nov. 20. Announcement is also made that freight will be allowed on shipments to consumers in

### Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to ⅝-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

\*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.  
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia, Berks, Northampton, Lehigh Counties, Pa., Warren County, N. J., and the State of Delaware, on steel bars, shapes, hoops, bands and cold-finished bars.

**Imports.**—Arrivals of pig iron at this port in the week ended Nov. 17 totaled 855 tons, of which 706 tons came from British India and 149 tons from the Netherlands. A total of 335 tons of spiegeleisen and 31 tons of ferromanganese was received from the United Kingdom and 900 tons of chrome ore from Portuguese Africa. Steel imports consisted of 43 tons of structural shapes from Germany and 35 tons from France, seven tons of strip steel from the United Kingdom, eight tons of iron bars from Sweden and 1002 tons of skelp from France.

**Old Material.**—All grades of iron and steel scrap are inactive. Although prices are substantially unchanged, there is an undertone of weakness. Heavy breakable cast is not quotable at more than \$16, based on offers made by dealers. A small tonnage of No. 1 cast has been sold by a broker at \$17 per ton, delivered, but the maximum price today is said by sellers to be \$16.75 per ton, delivered. No. 1 heavy melting steel is quiet; on a moderate sized tonnage, dealers believe \$15.50 per ton is the market.

### Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$15.50 to \$16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.00 to 11.25
Heavy axle turnings (or equiv.)	12.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.00
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	21.50 to 22.00
No. 1 forge fire	12.50 to 13.00
Cast iron carwheels	16.50
No. 1 cast	16.25 to 16.75
Cast borings (for chem. plant)	15.00
Steel rails for rolling	16.50 to 17.00

### Reduction in Building

Building construction in the United States in October is placed at an index of 243 by the Associated General Contractors of America. This is on the base of 100 for the average of 1913. It shows a sharp reduction from the 266 in September, but otherwise, except for the 244 in June, was the highest figure yet reached.

The first unit of the new by-product coke plant of the Davison Coke & Iron Co., Neville Island, Pittsburgh, will be one of 35 Koppers-Becker ovens and will be built by the Koppers Construction Co., which also will build and instal the coal and coke handling equipment, the by-product, benzol and gas purification units.



## Cleveland

### Releases by Automobile Companies Increase Steel Bookings —Pig Iron Sales Heavy, Some for All of First Half

CLEVELAND, Nov. 20.—The demand for finished steel increased the past week following the lull during the earlier part of the month. The increase is due to a large extent to the releasing of larger specifications by the automotive industry, which evidently is planning heavier production schedules during the latter part of December. Better specifications have come from this source for sheets and hot-rolled strip. Most buyers in other fields are taking out about all the steel covered by their contracts. Mills are getting a fair amount of business in current orders for steel bars, plates and structural material. Quite a little inquiry has come out for first quarter contracts. Many of the larger consumers of alloy steel bars have covered for the quarter and some contracts for that delivery have been placed by the automotive industry for sheets and hot and cold-rolled strip steel. Some of the steel bar users in that field are anxious to have prices named for the first quarter to be used as a basis for figuring contracts with automobile manufacturers, but none of the mills has as yet named first quarter prices on steel bars, plates and shapes.

Local structural awards during the week included two 3000-ton lots. There is not much new inquiry.

Local mills continue to quote steel bars at 1.90c., Cleveland, and while 1.95c., Pittsburgh, is the usual quotation by outside mills, they find it necessary to go to 1.90c. for shipment to some points because of the Cleveland mill competition. In using a Cleveland base, outside makers quote 1.95c. to 2.05c. Plates and structural shapes are commonly quoted at 1.95c. to 2c., Pittsburgh.

**Iron Ore.**—The consumption of Lake Superior ore during October was 5,024,642 tons, a gain of 416,679 tons for the month. This compares with 4,023,985 tons consumed in October last year. Furnace stocks Nov. 1 amounted to 33,081,717 tons and stocks on furnace yards and Lake Erie docks on that date amounted to 39,554,612 tons, compared with 42,163,529 tons on the same date a year ago. There were 169 furnaces in blast Oct. 31, an increase of eight for the month. Ore shipments this month up to Nov. 16, inclusive, amounted to approximately 3,500,000 tons. As several of the ore firms shipped their last cargoes Monday, shipments will be rather light during the remainder of the month.

**Pig Iron.**—The market continues very active in foundry and malleable grades. Sales by Cleveland interests during the week were 52,000 tons, only slightly less than those of the week before. Prices are firm at the recent advance. Buying is now extending into second quarter. A Cleveland producer, after having sold considerable iron for the first quarter, announced last week that it would hereafter limit its sales to contracts for the entire first half and has made several sales for the most extended deliveries at \$18.50, furnace, for out-of-town shipment. Other producers have not yet opened their books for delivery beyond the first quarter. One Lake furnace is holding to \$19 for foundry and malleable iron and is making sales at that price in Indiana, but this price virtually shuts this producer out of the Ohio market. The

Cleveland furnace price for local delivery is \$19, furnace, and \$20 is the ruling price in Michigan. Several large consumers in the automotive field have contracted for the first quarter, but some of the larger consumers in other fields have not yet bought for that delivery. Among current inquiries is one from the Link-Belt Co., Indianapolis, for 5000 tons of malleable iron. Southern foundry iron has been advanced 25c. a ton to \$16.50, Birmingham. A \$2 a ton advance on Ohio silvery iron has been announced.

Prices per gross ton at Cleveland:	
N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25	22.50
Malleable .....	19.50
Ohio silvery, 8 per cent. ....	30.00
Basic Valley furnace.....	\$17.50 to 18.00
Stand. low phos., V'ley fur. 26.50 to	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

**Alloy Steel Bars.**—Manufacturers have opened their books for the first quarter at 2.65c., base, for large buyers and at 2.75c. for smaller consumers. A number of the larger consumers in the automotive industry have already placed contracts for the quarter. The 2.65c. base is a \$2 a ton concession from the regular quotation, but there have been recent reports of price shading. Previous to the adoption of the present method of quoting, with one base and added alloy differentials, there was a spread in prices and the attempt to maintain one price for both large and small buyers is said to have not worked out satisfactorily.

**Sheets.**—Nearly all the mills have

#### Warehouse Prices, f.o.b. Cleveland

Base per Lb.	
Plates and struct. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip.....	5.95c.
Black sheets (No. 24).....	3.50c.
Galvanized sheets (No. 24).....	4.25c.
Blue ann'l'd sheets (No. 10).....	3.35c.
No. 9 ann'l'd wire, per 100 lb.....	\$2.85
No. 9 gal. wire, per 100 lb.....	3.30
Com. wire nails, base per keg.....	2.85

\*Net base, including boxing and cutting to length.

adopted the \$2 a ton price advance on all grades for current orders and the first quarter. However, some have not yet closed the door on regular customers who wish to place tonnage at the old prices that can be delivered in December. The market has a firm tone and some first quarter business, particularly in auto body sheets, has been taken at the new prices. Advances of \$2 a ton are announced on tin mill black plate to 3c., Pittsburgh, and on tin plate to \$5.35. Mill operations show a slight decrease.

**Coke.**—The current price of \$7.75, Painesville, for by-product foundry coke has been reestablished for December shipment. Specifications are good, but new demand is light.

**Reinforcing Bars.**—The seasonal falling off in the demand is in evidence. On billet steel bars, 1.85c., Cleveland, apparently has not disappeared. Rail steel bars are quoted at 1.95c., mill.

**Wire Products.**—Nails are moving slowly. Jobbers have good stocks, some evidently having taken advantage of concessions that some mills have allowed recently from the \$2.55 price. Wire is firm. It is still uncertain whether prices will be advanced for the first quarter.

**Warehouse Business.**—Sheets are moving well, but the demand for other products is somewhat lighter than during October. This is regarded as a seasonal falling off due in part to a lessened demand from the building field.

**Strip Steel.**—Several consumers in the automotive field have placed first quarter contracts at the prices announced a week ago by some of the mills, or at the same prices that have been prevailing recently. These are 1.90c., Pittsburgh, for hot-rolled strip up to 6 in. wide and 2c. for 6 in. and wider and 2.85c., Cleveland and Pittsburgh, for cold-rolled strip. Some of the mills are holding to 2.95c. on the latter for small lots. Fender stock has been quoted for the next quarter at 4.25c., Cleveland and Pittsburgh, for No. 20 gage and 4.40c. for No. 22 gage, an advance of \$2 a ton. Specifications, which recently showed a lull, are now coming out somewhat heavier as automobile plants are ordering material for increased production schedules in December. Mills making narrow strip are crowded with orders, but the situation is easier with wide strip mills because of the large capacity. Shipments have been held up temporarily by a leading Detroit automobile manufacturer because material was coming in too fast.

**Semi-Finished Steel.**—Specifications are holding up to the recent heavy volume. The leading Cleveland producer, which recently advanced prices to \$34, Cleveland and Youngstown, for sheet bars, billets and slabs, is still adhering to that quotation for the three products, although Youngstown mills have come out with a \$33 price on large billets and slabs.

**Bolts, Nuts and Rivets.**—The demand is not as heavy as in October,

which is evidently due to the slowing down in the automotive industry. There are indications that the present discount of 70 per cent off list will be re-established for the first quarter, although there is a possibility of an advance in wire, which is used for fully half the tonnage of bolts, and also an advance on steel bars for the next quarter. Rivets are moving fairly well.

**Fluorspar.**—Recent sales have been limited to small lots for filling in during the remainder of the year. While prices have not yet been announced for next year, there are indications that the present \$18 price will be named for gravel fluorspar for the first quarter. This is from \$1 to \$2 a ton above the price consumers paid during the last half of this year.

**Old Material.**—A Cleveland mill has bought 5000 tons of No. 1 heavy melting steel scrap from dealers and producers at about \$16. This consumer requires a grade of scrap that brings a price well above common grades. Dealers are paying \$15.75 against this contract. The market is steady at recent prices without apparent trend in either direction. The only exception is a decline of 50c. a ton on No. 1

busheling, which goes to the Valley district, there being no local demand. Dealers are paying \$11.25 to \$11.50 for blast furnace scrap. Heavy melting steel is bringing \$17 from dealers in the Youngstown district.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$14.50 to \$15.00
No. 2 heavy melting steel	14.00 to 14.50
Compressed sheet steel	14.00 to 14.50
Light bundled sheet	
stamp'gs	12.00 to 12.50
Drop forge flashings	12.25 to 12.75
Machine shop turnings	9.50 to 10.00
No. 1 railroad wrought	12.75 to 13.00
No. 2 railroad wrought	14.50 to 15.00
No. 1 busheling	12.50 to 13.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops	16.00 to 16.50
Low phos., billet, bloom	
and slab crops	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap	15.50 to 16.00
Blast Furnace Grades	
Cast iron borings	11.00 to 11.50
Mixed borings and short	
turn'gs	11.00 to 11.50
No. 2 busheling	11.00 to 11.50
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	16.75 to 17.25
Miscellaneous	
Railroad malleable	16.00 to 16.50
Rails for rolling	16.25 to 16.50

## New York

### Pig Iron Business Continues in Good Volume—Some Sales of Sheets at the New Prices

NEW YORK, Nov. 20.—A steady demand for pig iron is indicated by the week's sales in this district, amounting to over 14,000 tons, and by a good flow of new inquiries. The upward trend of pig iron prices has halted and, if anything, the tone of the market is easier. While the base price of \$18, Buffalo, on foundry iron appears to be holding fairly well, silicon differentials have been waived in some instances. The Thatcher Co., Newark, N. J., has closed for 4000 to 5000 tons, part of which covered a stock of barge iron stored at a New Jersey port. The Farrell-Birmingham Co., Ansonia, Conn., has bought 1500 tons, and the Worthington Pump & Machinery Corporation has concluded purchases against its inquiry for 2605 tons for various plants. The General Electric Co. has placed 175 tons of No. 2X for its Bayway, N. J., plant and is understood to be in the market for other plants. The Newbury Mfg. Co., Monroe, N. Y., is inquiring for 300 tons of foundry iron. Other pending business includes 2000 tons for the remainder of this year and possible additional tonnage for the first quarter, also a lot of 1500 tons for the first quarter and a third lot of 1000 tons for next quarter. Sizable supplementary requirements are indicated by scattered inquiries for smaller ton-

nages for delivery this year. Current demand, however, is mainly for 1929.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$22.91
*Buf. No. 2, del'd east.	
N. J.	21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	\$21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	22.39 to 23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

\*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

**Ferroalloys.**—Quotations for spiegeleisen in carload lots have been advanced \$1 per ton. The 19 to 21 per cent alloy is now quoted at \$34, furnace, with the 16 to 19 per cent quoted at \$33. These quotations are effective at once. Several contracts involving large tonnages for next year's delivery have been renewed at prices which prevailed early this year. In ferromanganese there is some buying of carload and small lots and also further contracting for 1929 delivery, all at \$105, seaboard basis.

**Reinforcing Bars.**—Distributors in this territory have advanced New York warehouse prices \$1 a ton and are now quoting 2.85c. per lb. for lots of 5 tons or more, 3c. for lots of 2 to 5 tons and 3.25c. for less than 2 tons, all delivered at job. Mill prices are unchanged at 2c., Pittsburgh, for

40, 50 and 60-ft. lengths, and 2.25c., Pittsburgh mill warehouse, for the cut lengths. The Turner Construction Co. has been awarded the general contract on the Jersey City terminal warehouse of the Delaware, Lackawanna & Western Railroad Co., but the bars will be bought direct by the railroad. Business has been very quiet in the past week, with both awards and new projects calling for small tonnages.

### Warehouse Prices, f.o.b. New York

Base per Lb.	
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terme sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Per Cent Off List	
Machine bolts, cut thread:	
¾ x 6 in. and smaller	.60
1 x 30 in. and smaller	.50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller	.60
¾ x 20 in. and smaller	.50 to 50 and 10
Coach screws:	
¾ x 6 in. and smaller	.60
1 x 16 in. and smaller	.50 to 50 and 10
Per 100 Ft.	
Boiler Tubes—	
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

### Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.	46	29
¾-in. butt.	51	37
1-3-in. butt.	53	39
2½-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12
Wrought Iron—		
½-in. butt.	5	+19
¾-in. butt.	11	+9
1-1½-in. butt.	14	+6
2-in. lap.	5	+14
3-6-in. lap.	11	+6
7-12-in. lap.	3	+16

### Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box—		
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

### Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

### Sheets, Box Annealed—Black, C. R. One Pass

Per Lb.	
Nos. 18 to 20	3.60c. to 3.80c.
No. 22	3.75c. to 3.95c.
No. 24	3.80c. to 4.00c.
No. 26	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30	4.30c. to 4.50c.

### Sheets, Galvanized

Per Lb.	
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.



**Sheets and Strips.**—Advances of \$2 a ton on all finishes of sheets for first quarter and spot shipment have apparently been general in this district, and there have been a few small sales to cover current needs at the new levels, namely 2.85c. per lb., Pittsburgh, for black, 3.60c. for galvanized, and 2.10c. for blue annealed sheets. Some large consumers are also negotiating for first quarter requirements and mills are generally firm in quoting the new levels. Some opposition to the prices is being encountered in the case of jobbers who are forced to accept a lower discount than was formerly allowed. Specifications came in at a slightly better rate during the last week than in the earlier days of the month, but November business will show a considerable falling off from October unless the last few days of the month prove to be unusually active. Cold-rolled strip is quoted at 2.85c. to 2.95c., Pittsburgh or Cleveland, with the higher quotation obtainable on most of the new business. Demand is not active. Hot-rolled strip is also quiet, with 1.90c. the ruling quotation on widths of more than 6 in. and 2c. obtainable on the narrower widths.

**Plates, Shapes and Bars.**—Small-lot buyers of bars who are not covered by contract are now paying 2c., Pittsburgh, in almost all cases. Most of the larger buyers are taking regular shipments on contracts which were made at 1.90c. and 1.95c., Pittsburgh. The plate market is quiet, but a good deal of work in pipe lines and shipbuilding is in prospect. The usual price for plates is 2.27½c. per lb., delivered New York, but on sizable orders the quotation is frequently 2.22½c. Small-lot buyers, however, are paying 2.32½c. No large contracts for structural steel have been closed in the week, but mills and fabricators are figuring on a large aggregate tonnage.

*Mill prices per lb., deliv'd New York:* Soft steel bars, 2.29c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c. to 2.24c.

**Warehouse Business.**—Jobbers report a fair volume of buying and prices steady except for continued shading on black and galvanized sheets. Concessions on galvanized sheets range from \$2 to \$3 a ton on desirable orders. Business has improved slightly since election, but the month is not expected to reach the total of tonnage shipped from stock in October.

**Cast Iron Pipe.**—Northern makers of pressure pipe are maintaining the recent price advance, but the volume of new inquiry continues rather small. Stamford, N. Y., has been accepting bids on about 420 tons of 10-in. Classes A and B water pipe and there is some export inquiry. A large export house dealing with South American markets has asked for prices on 396 metric tons of 4, 6, 8, 10 and 12-in. water pipe and about 15 tons of fittings for Peru, and a New York construction company is reported in the market for about 15,000 tons of pipe for export to South

America. Much of the current domestic business is still limited to small lots to complete installations, such as the purchase by Geneva, N. Y., of about 70 tons of 8-in. water pipe from the McWane Cast Iron Pipe Co.

*Prices per net ton, deliv'd New York:* Water pipe, 6-in. and larger, \$37.60 to \$38.60; 4-in. and 5-in., \$42.60 to \$43.60; 3-in., \$52.60 to \$53.60; Class A and gas pipe, \$4 to \$5 extra.

**Coke.**—Consumers in this district using by-product and special beehive brands of foundry coke have in most cases covered their requirements for first quarter or first half of next year. Connellsville producers have adopted a firmer attitude, but desirable tonnages still bring out concessions from the quoted prices. Standard foundry ranges from \$3.50 to \$3.75 per ton, Connellsville, and standard furnace from \$2.85 to \$3.05, Connellsville. Special brands of foundry coke are quoted at \$4.85 per net ton, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark and \$9.44 to New York or Brooklyn. By-product foundry coke prices are \$9 to \$9.40 Newark or Jersey City, and \$10.06, New York or Brooklyn.

**Old Material.**—Iron and steel scrap contracts are being completed by brokers, who report no difficulty in obtaining a plentiful supply of material at present prices. New buying by consumers is still limited to small

lots at prices that show a tendency to decline. No. 1 heavy melting steel is being purchased by brokers at \$14 to \$15 per ton, delivered. Yard grade of heavy melting steel is being bought at \$11.75 to \$12 per ton, delivered, but only a small tonnage is moving to consumers on old contracts. Stove plate is quoted at \$12 per ton, delivered to a Phoenixville, Pa., consumer and machine shop turnings at \$11 to \$11.25 per ton, delivered to the same mill. Dealers point out that stocks of scrap on consumers' yards are not large.

*Dealers' buying prices per gross ton, f.o.b. New York:*

No. 1 heavy melting steel	\$11.75 to \$12.00
Heavy melting steel (yard)	8.25 to 8.50
No. 1 hvy. breakable cast.	11.25 to 11.75
Stove plate (steel works)	8.50
Locomotive grate bars....	8.75 to 9.25
Machine shop turnings....	7.50 to 7.75
Short shoveling turnings..	7.25 to 7.75
Cast borings (blast furn. or steel works).....	6.75 to 7.00
Mixed borings and turnings .....	6.75 to 7.00
Steel car axles .....	17.50 to 18.00
Iron car axles .....	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire .....	8.00 to 8.50
No. 1 railroad wrought....	12.25 to 12.75
No. 1 yard wrot., long....	11.25 to 11.75
Rails for rolling .....	13.00 to 13.50
Cast iron carwheels.....	12.00 to 12.50
Stove plate (foundry)....	9.50
Malleable cast (railroad)...	10.00 to 10.50
Cast borings (chemical)...	11.25
<i>Prices per gross ton, deliv'd local foundries:</i>	
No. 1 machry. cast.....	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size .....	15.00
No. 2 cast (radiators, cast boilers, etc.).....	14.50

## Germany Develops Chromium Plating

### Preliminary Coating of Non-Ferrous Metal on Steel Makes Even Plating and Prevents Chipping Under Stress

HAMBURG, GERMANY, Oct. 20.—Chromium plating has developed more slowly in Germany than in other countries, although German manufacturers are combined in the Chrom-Interessen-Gemeinschaft and are constantly exchanging experimental information with the American Chromium Corporation and British companies. Plating with chromium has not met with great success in Germany, as it is claimed that the plating chips too easily when the steel is undergoing a severe test or is used as a cutting material. It is further stated by the manufacturers who have experimented with chromium-plated steel that it is impossible to determine that all parts of the material being plated will receive a uniform coating of about 1/100 mm. Microscopic tests are said to have proved that the plating on steel varies from 1/80 to 1/150 mm. It is also claimed that chromium suffers decidedly from fatigue, especially when it is plated on steel in constant and regular use.

Experimentation is understood to show that copper and brass, plated with chromium, do not develop the unsatisfactory defects of steel. The plating has been found to range in thickness from 1/95 to 1/105 mm. and does not chip, even when submitted to a severe test. Following recent experiments, steel has been

coated with a thin plating of copper or cadmium, after which it is chromium plated. In this way, chromium-plated steel has been found to meet as severe tests as non-ferrous metals. This treatment increases the cost of production and experiments continue in an effort to cheapen output.

It has also been found that a variety of colors in the chromium plating is obtainable by changing the electric current in the bath. Milky, gray, bright or dull silver plating has been developed, and an effort is being made to produce both red and gold tints by this method.

Makers are understood to be considering the production of wire, coated with cadmium and plated with chromium, to export to the African native trade, which consumes large quantities of copper and aluminum wire in making jewelry, such as arm and leg bands. The cost would be about 50 per cent less than copper or aluminum wire, and its non-corrosive quality should be an attractive feature.

Joseph T. Ryerson & Son, Inc., Sixteenth and Rockwell Streets, Chicago, with plants in a number of large cities, has taken the agency for portable electric tools manufactured by the Millers Falls Co., Millers Falls, Mass.

## Pacific Coast

### Steel Inquiries More Numerous—Price Situation Firmer— 800 Tons of Plates for Oil Tanks

SAN FRANCISCO, Nov. 17. (*By Air Mail*).—While awards of iron and steel products on the Pacific Coast this week were not heavy, inquiries are more numerous and a considerable tonnage is pending. The outstanding letting called for 800 tons of plates for two additional 134,000 bbl. oil storage tanks for the General Petroleum Corporation at Los Angeles, placed with the Western Pipe & Steel Co. The price situation is somewhat firmer, save in out-of-stock prices on reinforcing steel bars in the Los Angeles and San Francisco districts.

**Pig Iron.**—Bids were opened this week on 300 tons of No. 2 foundry iron for the Quartermaster Supply Officer at Fort Mason, San Francisco, but no award has been made. A shipment of several hundred tons of Indian pig is due to arrive on the Coast the latter part of this month. Imports of iron in August totaled 2383 tons.

*Prices per gross ton at San Francisco:*  
\*Utah basic ..... \$25.00 to \$26.00  
\*Utah fdy., sil. 2.75 to  
3.25 ..... 25.00 to 26.00  
\*\*Indian fdy., sil. 2.75 to  
3.25 ..... 24.00 to 25.00

\*Delivered San Francisco.  
\*\*Duty paid, f.o.b. cars San Francisco.

**Bars.**—The largest letting called for 225 tons for a hotel at Santa Cruz, Cal., booked by the Truscon Steel Co. An award of 1800 tons for the Life Science Building at Berkeley will be made within a few days. Pending business exceeds 7000 tons. Imports of bars during August totaled 2388 tons, compared with 3615 tons for the previous month and 3638 tons for August a year ago. Out-of-stock quotations on reinforcing bars continue at 1.80c., base, in San Francisco and Los Angeles districts. Merchant bars appear to be firm at 2.30c., c.i.f. Coast ports.

**Plates.**—In addition to two 134,000 bbl. tanks for the General Petroleum Corporation, Los Angeles, requiring 800 tons, awarded to the Western Pipe & Steel Co., the Llewellyn Iron Works secured 370 tons for a 40-in. pipe line for Los Angeles; the Pacific Coast Engineering Co. booked 185 tons for 20-in. shore pipe for the United States Engineer office, San Francisco, and the Bethlehem Shipbuilding Corporation took 340 tons for

two barges and one tug boat, the tug boat and one barge being for the Inter-Island Steam Navigation Co., Honolulu. Bids were opened this week on 550 tons for a 24-in. riveted pipe line at Seattle. Vancouver, B. C., will open bids on Dec. 11 for 125 tons of 18-in. pipe. Prices continue firm at 2.25c., c.i.f., as a minimum.

**Shapes.**—The California Steel Co. was awarded 103 tons for a factory in Oakland and the Bethlehem Shipbuilding Corporation booked 106 tons for a barge for the Inter-Island Steam Navigation Co., Honolulu. Inquiries include 1500 tons for an apartment in San Francisco and 425 tons for a saw mill for the Weyerhaeuser Lumber Co. in Washington. Imports in August totaled 1745 tons, compared with 1428 tons in July and 3067 tons in August, 1927. Of the total, 1418 tons was taken by San Francisco fabricators. Plain domestic shapes are firm at 2.35c., c.i.f., while foreign shapes are about 1.60c., c.i.f., duty paid.

**Cast Iron Pipe.**—Little improvement in demand for cast iron pipe has oc-

curred recently, and awards this week did not exceed 600 tons. Phoenix, Ariz., placed 164 tons of 2 to 12-in. Class B pipe with an unnamed maker. Watson & Sutton took 106 tons of 4 to 10-in. Class B pipe for the improvement of Turquoise Street, San Diego, and L. Coluccio took 305 tons of 30-in. Classes A and B pipe for the improvement of East Olive Street, Seattle. Bids were opened this week on 1640 tons of 24-in. Class B pipe for Seattle, and on 111 tons of 12-in. Class B pipe for Aberdeen, Wash. The only new inquiry of importance calls for 548 tons of pipe for the improvement of Arlington Street, Los Angeles, bids on which will be opened Dec. 3. During August 2174 tons of pipe was imported on the Coast, compared with 4135 tons in the preceding month and 4211 tons in August, 1927.

**Steel Pipe.**—Bids were opened this week on 102 tons of ¾-in. and 1-in. galvanized pipe for Los Angeles. No outstanding pipe line tonnages are up for figures. Imports of tubular products in August were 3833 tons, compared with 2157 tons in July and 1794 tons in August a year ago.

**Coke.**—A shipment of 4000 to 5000 tons of English by-product and bee-hive coke is due to arrive late this month. Coke importations in August totaled 10,543 tons, compared with 4659 tons in July and 8115 tons in August a year ago.

## St. Louis

### Pig Iron and Scrap Markets Continue Strong—Sheet Mills Active—10,000-Ton Rail Order Placed

ST. LOUIS, Nov. 20.—Sales of pig iron by the St. Louis Gas & Coke Corporation during the last week totaled 8700 tons, including 5000 tons of basic to an East Side melter for shipment during the remainder of 1928 and 2000 tons of malleable to a northern Illinois melter and 3700 tons of foundry iron for first quarter shipment. Of the foundry iron, a Kansas melter and a local machinery manufacturer took 500 tons each, and 400 tons will go to a northern Illinois consumer. The melt in the district continues heavy, with especial activity by car building, implement and stove interests, the latter enjoying one of the best seasons in years. The Granite City maker is now quoting malleable iron 50c. a ton higher than the foundry grade. That company expects to blow in on Dec. 1 its second furnace, which has been idle several months for relining and other repairs. Southern makers have opened their books for first quarter at an advance of 25c. a ton.

*Prices per gross ton at St. Louis:*  
No. 2 fdy., sil. 1.75 to 2.25, f.o.b.  
Granite City, Ill. .... \$20.00  
Malleable, f.o.b. Granite City ..... 20.50  
N'th'n No. 2 fdy., deliv'd St. Louis.. 22.16  
Southern No. 2 fdy., deliv'd ..... 20.92  
Northern malleable, deliv'd ..... 22.16  
Northern basic, deliv'd ..... 22.16

Freight rates: 81c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

**Finished Iron and Steel.**—The Granite City Steel Co. has advanced sheet prices \$2 a ton, in line with similar action by Chicago and Eastern mills. While the demand for sheets has fallen off since the first of the month, the Granite City company has sufficient bookings to operate its sheet mills at full capacity. Five of the steel company's 20 tin mills are down for repairs. Business in tank plates is dull. Warehouse business is about on a par with last week's volume. Struc-

#### Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock.....	3.75c.
Black sheets (No. 24).....	4.10c.
Galv. sheets (No. 24).....	4.95c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.15c.
Galv. corrug. sheets.....	5.00c.
Structural rivets.....	3.75c.
Boiler rivets.....	3.75c.

#### Per Cent Off List

Tank rivets, ¾-in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

#### Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, ¾-in. and over.....	3.15c.
Small angles, under ¾-in.....	3.55c.
Small channels and tees, ¾-in. to 2¾-in.....	3.75c.
Spring steel, ¾-in. and thicker.....	5.00c.
Black sheets (No. 24).....	5.00c.
Blue ann'l'd sheets (No. 10).....	4.00c.
Galv. sheets (No. 24).....	5.40c.
Struc. rivets, ¾-in. and larger.....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c'd nails, 100 lb. keg.....	3.40



tural fabricators are operating on a large number of small orders.

**Rails and Track Supplies.**—The Missouri-Kansas-Texas has bought 10,000 tons of 90-lb. rails for 1929 from the Inland Steel Co., Bethlehem Steel Co., Illinois Steel Co. and Tennessee Coal, Iron & Railroad Co. The Wabash has issued an inquiry for its rail requirements for 1929, but no tonnage is stated.

**Old Material.**—As the result of orders for railroad cars being placed or in prospect, purchases of a limited tonnage of specialties and rails were made during the week by several companies. However, mills and dealers cannot agree on prices, some mills endeavoring to buy old material at the market prevailing 30 days ago. Advances of 25c. a ton were made this week on miscellaneous standard-section rails, railroad springs, railroad malleable and rails for rolling. Railroad lists include: Southern, 8200 tons; Chicago & Alton, 1165 tons; In-

ternational Great Northern, 620 tons; New Orleans & Great Northern, 100 tons, and Nickel Plate, 34 carloads.

*Dealers' buying prices, per gross ton, f.o.b. St. Louis district:*

No. 1 heavy melting or shoveling steel.....	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel.....	12.25 to 12.75
No. 1 locomotive tires.....	14.50 to 15.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart...	15.00 to 15.50
Railroad springs.....	16.00 to 16.50
Bundled sheets.....	9.50 to 10.00
No. 2 railroad wrought.....	13.25 to 13.75
No. 1 busheling.....	9.50 to 10.00
Cast iron borings.....	8.75 to 9.25
Iron rails.....	13.50 to 14.00
Rails for rolling.....	15.50 to 16.00
Machine shop turnings.....	9.00 to 9.50
Steel car axles.....	19.00 to 19.50
Iron car axles.....	27.00 to 27.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought.....	12.00 to 12.50
Steel rails, less than 3 ft.....	17.50 to 18.00
Steel angle bars.....	14.25 to 14.75
Cast iron carwheels.....	14.00 to 14.50
No. 1 machine cast.....	15.50 to 16.00
Railroad malleable.....	15.00 to 15.50
No. 1 railroad cast.....	14.00 to 14.50
Stove plate.....	12.50 to 13.00
Agricult. malleable.....	11.50 to 12.00
Relay. rails, 60 lb. and under.....	20.50 to 23.50
Relay. rails, 70 lb. and over.....	26.50 to 29.00

## Cincinnati

### Alabama and Tennessee Iron Up 25c—Jackson County Silvery Advanced \$2—Scrap Declines

CINCINNATI, Nov. 20.—Interest in the pig iron market centers in the upward trend of prices. Alabama and Tennessee makers have advanced quotations 25c. a ton to \$16.50, base Birmingham, and there is a possibility of a further increase of 50c. Closely following the announcement by Southern producers has come an advance of \$2 a ton on all grades of Jackson County silvery iron and Bessemer ferrosilicon, the new schedule specifying a price of \$27, base Jackson, for 8 per cent. Pig iron sales in the past week totaled about 5000 tons, divided almost equally between Northern and Southern iron. Bookings included 2000 tons of Northern foundry for an Indiana melter, 500 tons for each of two Ohio consumers, and 600 tons for a central Ohio company. The growing number of inquiries indicates that many buyers are watching the market closely to prevent the necessity of paying higher prices for first quarter requirements. Pending business includes 5000 tons of foundry for a central Indiana company, 800 tons for a local melter and 700 tons for a Greenville, Ohio, company. Reports are that the Marting Iron & Steel Co., Ironton, Ohio, will blow in a blast furnace soon to convert into pig iron a considerable quantity of ore remaining on its yards. If this furnace is put into operation, it is likely to be for only a short run. Southern Ohio foundry iron remains nominally at \$18.50, base Ironton.

*Prices per gross ton, deliv'd Cincinnati:*  
So. Ohio fdy., sil. 1.75 to 2.25.....\$20.39  
Ala. fdy., sil. 1.75 to 2.25..... 20.19  
Ala. fdy., sil. 2.25 to 2.75..... 20.69  
Tenn. fdy., sil. 1.75 to 2.25..... 20.19  
S'th'n Ohio silvery 8 per cent..... 25.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

**Coke.**—By-product foundry coke specifications continue to lag considerably behind those of October. The curtailment of demand is partly attributed to a reduction in the melt of foundries associated with the automobile industry, although lessened requirements by consumers are reported to be rather general. Domestic grades are moving in liberal volume. Wise County beehive foundry coke is quoted at \$4.25 to \$5.25, ovens, with furnace coke selling at \$3.50. New River beehive foundry coke is firm at \$6 to \$6.50, ovens.

**Finished Material.**—Steel sheet specifications turned upward the past week, with the result that mills in this district added somewhat to their unfilled tonnage. Much of the business came from automobile companies, which again are releasing substantial shipments. However, bookings from other sources also have been satisfactory and mill operations are being sustained at practically 100 per cent

#### Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinforce. bars.....	3.15c.
Rail steel reinforce. bars.....	3.00c.
Hoops.....	4.00c. to 4.25c.
Bands.....	3.95c.
Cold-fin. rounds and hex.....	3.85c.
Squares.....	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets.....	3.85c.
Small rivets.....	.65 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg.....	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.....	\$18.00
4-in.....	38.00
Seamless steel boiler tubes, 2-in.....	19.00
4-in.....	39.00

of capacity. The American Rolling Mill Co. has announced an advance of \$2 a ton on all grades of sheets, the new schedule calling for 2.10c., base Pittsburgh, on blue annealed; 2.85c. on black; 4.10c. on automobile body stock, and 3.60c. on galvanized. Makers of cold-rolled strip steel are asking 2.85c. to 2.95c., base Pittsburgh or Cleveland, while hot strip steel is on a basis of 1.90c., Pittsburgh, for material from 6 to 24-in. wide. Structural steel fabricating shops are in need of work, recent lettings having been small. Bars, shapes and plates are being sold in carload lots at 2c., base Pittsburgh, but larger tonnages are being taken at \$1 a ton less.

**Old Material.**—Heavy melting steel has declined 25c. a ton and other items have dropped 25c. or 50c. Despite the downward trend of prices, dealers are of the opinion that quotations will remain close to their present level during the remainder of the year on account of the high rate of consumption by steel plants and other users of scrap.

*Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:*

Heavy melting steel.....	\$13.00 to \$13.50
Scrap rails for melting.....	13.25 to 13.75
Loose sheet clippings.....	9.50 to 10.00
Bundled sheets.....	10.25 to 10.75
Cast iron borings.....	9.50 to 10.00
Machine shop turnings.....	9.00 to 9.50
No. 1 busheling.....	10.75 to 11.25
No. 2 busheling.....	6.25 to 6.75
Rails for rolling.....	14.00 to 14.50
No. 1 locomotive tires.....	14.00 to 14.50
No. 2 railroad wrought.....	13.00 to 13.50
Short rails.....	19.00 to 19.50
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast.....	18.50 to 19.00
No. 1 railroad cast.....	14.75 to 15.25
Burnt cast.....	10.50 to 11.00
Stove plate.....	10.50 to 11.00
Brake shoes.....	10.25 to 10.75
Railroad malleable.....	14.00 to 14.50
Agricultural malleable.....	13.00 to 13.50

## Detroit

### Automobile Production Declines

DETROIT, Nov. 20.—The dropping off in automobile production in the Detroit area is having its effect on industry in general and on steel bookings in particular.

The labor barometer, which is a statement of the combined payrolls of representative firms constituting two-thirds of the city's industrial population, shows a decrease this week of 1936, with a present total of 297,737. Over the last four weeks, all of which showed a decrease, the average is found to be about 3400 per week. The present total, however, is still very much higher than that of a year ago, which was 194,301.

October shipments of the Buick Motor Car Co. set a new record, at 28,614, a gain of 1814 units over the previous month.

W. S. Knudsen, president Chevrolet Motor Car Co., in announcing the new six-cylinder model, estimates full production by Dec. 15. The schedule for December is tentatively set at 32,000 units. This will be increased in January to 104,000 units. Mr. Knudsen estimates that 1929 production will amount to 1,500,000 units.

The Chrysler Corporation in October sold 60,000 cars, which sets an all-time record. For the remainder of the season, however, it is expected that a reduction in the production rate will be ordered.

The Ford Motor Co. has reached a daily production rate of 6000 units, an increase of approximately 500 per day over the September figure. Total production for October was 106,404 units.

Graham-Paige set a record in October, with production of 4921 units.

The Hupp Motor Car Co. turned out 4129 cars in October, setting a new record.

The Oakland Motor Car Co.'s production for October was 17,232 cars, 1614 units greater than in the same period a year ago.

The Olds Motor Works shipped 7288 units during October, an increase of 73 per cent over the same figure of a year ago.

The Packard Motor Car Co. shipped 5802 cars in October, setting a new record and surpassing the figure of 5001, made in August of this year. The November schedule is 5500 units.

The Reo Motor Car Co. is preparing to introduce a new model, which in price range will drop in just under the Flying Cloud. It is stated that this car is to be built on entirely new

lines. Public announcement, however, will probably not be made before the middle of next month.

The Continental Motors Corporation is maintaining its high production schedules this month, and the same rate will probably be continued during December. This is the result of a large increase in demand for automobile motors and a standing order for 1000 crankshafts per day for the Ford Motor Co. T. M. Simpson, secretary of the company, believes that 1929 will surpass 1928 production.

The pig iron melt in the district is showing a slight tendency to decrease, owing to the seasonal slowing up in production among automobile producers. This will probably be offset in December with the bringing out of several new models by large makers.

Scrap prices are the same as quoted a week ago.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$13.00 to \$13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraulic comp. sheets	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 bushelling	10.50 to 11.00
Sheet clippings	8.00 to 8.50
Flashings	10.75 to 11.25

## Birmingham

### Southern Pig Iron Advanced 25c. Per Ton—Ensley Rail Mill to Resume Operations

BIRMINGHAM, Nov. 20.—Merchant producers of pig iron opened their books on Nov. 15 for first quarter at the base price of \$16.50 for No. 2 foundry. This advance of 25c. per ton is effective on sales for iron to be delivered during the remainder of the year as well as for first quarter. There has been no buying rush for first quarter iron, but furnace interests report several orders in round tonnage. The advance was not as large as was generally expected, and another increase before the end of the year is predicted by some. Very little iron has been stocked so far this month. No change in furnace operations has occurred during the past three weeks. Eighteen furnaces are in blast, of which 13 are on foundry, four on basic and one on ferromanganese. Work has been completed on the new No. 1 city furnace of the Sloss-Sheffield Steel & Iron Co., but no date has been announced for its operation.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$16.50
No. 1 fdy., 2.25 to 2.75 sil.	17.00
Basic	16.50

Finished Steel.—The Ensley rail mill of the Tennessee company will resume operations on Nov. 24. One of its largest orders is 65,000 tons of 100-lb. rails for the Louisville & Nashville, reported in these columns several weeks ago. Bookings of bars, plates and shapes during the first half of November have been up to the high

volume of the last half of October. Mill schedules in all departments are heavier than at any time in the past several seasons. Buyers are protecting themselves a little farther ahead in some lines, owing to the lengthening of deliveries. Quotations continue firm and unchanged. Fabricated structural steel plants report only one new order above 100 tons, 200 tons booked by the Southern Steel & Rolling Mill for the American Cast Iron Pipe Co. Reinforcing bar orders have been light for the past two weeks. The Alabama highway department will open bids on Nov. 26 for 487 tons of reinforcing steel. Open-hearth operations are unchanged; the Tennessee company has seven active at Fairfield and five at Ensley and the Gulf States Steel Co. four at Alabama City.

Cast Iron Pipe.—The market is quiet and shows no indications of improvement before the end of the year. Plants are operating at about 50 per cent of capacity. The volume of shipments has dropped a little, but is still fairly good for this season. Makers are holding closely to the new base prices of \$37 to \$38 on 6-in. and larger sizes.

Coke.—Requisitions on contracts are fairly good, but new business is quiet. First quarter requirements were well covered in the buying movement several weeks ago. Domestic coke sales have improved slightly. Quotations are unchanged; \$5 is the base for both spot and contract.

Old Material.—Buying is still in scattered lots. There has been some improvement in sales of steel scrap and No. 1 cast in the last few days. Prices are unchanged. Shipments to consumers are increasing.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	\$12.50
Scrap steel rails	\$12.00 to 12.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

## Canada

### Car Orders Stimulate Demand for Steel

TORONTO, ONT., Nov. 20.—The placing of more than \$20,000,000 worth of rolling stock orders by the two leading Canadian railroads has had a stimulating effect on steel business. Steel mills, foundries and other companies will benefit by the railroad buying. Large orders have been placed for sheets by Canadian automobile plants. Foundries have closed contracts that will keep them busy well into the new year. Considerable business in wire and chain rods is pending. Sales of these products this year have reached new high levels. Belgian wire rods are less prominent in the Canadian markets this year than in recent years.

Pig Iron.—Foundries are taking keen interest in the market, and new inquiries have recently appeared from a number for foundry and malleable iron for spot and future delivery. Sales for the week were larger than those of several past weeks. Some inquiry for first quarter is appearing, but so far producers are not encouraging business beyond the end of the year. While there has been no change in Canadian pig iron prices, shading has disappeared, and there are strong possibilities that the Canadian quotation will be at least \$1 per ton higher for first quarter.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Canadian fabricators report a steady flow of new orders. The Manitoba Bridge & Iron Works, Winnipeg, Man., has received an order for 1500 tons of structural steel from the Canadian National Railways for bridge construction. Business pending includes 2000 tons for the Hudson Bay Co. store at Calgary, Alta.; 250 tons for technical school at Oshawa, Ont.; 5000 tons for



Montreal University building at Montreal, Que.; 2500 tons for hotel building at Government and Belleville Streets, Victoria, B. C. Several large building projects recently announced for Toronto, including an addition to the T. Eaton Co. store, the Canadian Bank of Commerce Building and others, bring the total prospective demand for structural steel in this city alone to well over 25,000 tons.

**Old Material.**—Mills, foundries, sanitary ware and radiator makers, electric furnaces and various other consumers are showing keen interest in the market and their orders are increasing both in number and quantity. The demand affects practically all grades of scrap. Dealers are buying more extensively both for yard stocks and direct shipment to consumers. Bidding has been keen for a supply of scrap offered by the Toronto Electric Commission. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.50	\$7.00
Rails, scrap.....	10.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings..	7.00	5.00
Boiler plate.....	7.00	6.00
Heavy axle turnings.....	7.50	6.50
Cast borings.....	7.50	5.00
Steel turnings.....	7.00	5.50
Wrought pipe.....	5.00	5.00
Steel axles.....	14.00	20.00
Axles, wrought iron.....	16.00	22.00
No. 1 machinery cast.....	16.00	16.00
Stove plate.....	13.00	13.00
Standard carwheels.....	16.00	16.00
Malleable.....	13.00	13.00
Per Net Ton		
No. 1 machinery cast.....	15.00	....
Stove plate.....	9.00	....
Standard carwheels.....	13.00	....
Malleable scrap.....	13.00	....

## Butler Mfg. Co. Begins Aircraft Production

The Butler Mfg. Co., Kansas City, Mo., fabricator of sheet steel products and long identified with the aircraft industry through the manufacture of steel hangars and other airport equipment, has announced the formation of the Butler Aircraft Corporation to act chiefly as a selling organization for the airplanes and airplane equipment to be manufactured by the parent company. A large section of the company's plant in Kansas City has been set aside for the new manufacturing division, and production on two types of planes has already begun. Later the company expects to bring out other types of planes and accessories, with all-metal craft as the final development.

In commenting upon the new company, E. E. Norquist, president and general manager of the Butler organization, stated that the company's "early experience with airplane transportation, its contact with the aircraft industry and the trend toward a wider use of metal in aircraft construction all were important factors in prompting its entry into the manufacture of airplanes."

## Boston

### Pig Iron Firm—Scrap Sales Fall Off, with Some Recession in Prices

BOSTON, Nov. 20.—Pig iron sales the past week totaled 8000 tons. In the absence of open inquiries for attractive tonnages, prices appear firmer. Eastern Pennsylvania iron has been marked up 50c. a ton. Buffalo furnaces are maintaining their recent price advance. Other New York State iron and Mystic iron are firmly held at delivered prices equivalent to those on Buffalo iron.

**Finished Material.**—Indications are local steel mill representatives will book a slightly larger tonnage of finished material this year than in 1927 despite the fact that New England railroads have bought less material this year and that a large tonnage going into New England-made parts for Ford cars has been purchased outside these States. With the exception of shapes, all kinds of material will show an increase. The market on steel bars is 1.95c. to 2c. per lb., base Pittsburgh. Standard shapes are generally 1.95c. to 2c. per lb., Pittsburgh base, but on a large tonnage 1.90c. undoubtedly could be done.

**Foundry iron prices per gross ton deliv'd to most New England points:**

*Buffalo, sil. 1.75 to 2.25..	\$22.91
*Buffalo, sil. 2.25 to 2.75..	23.41
†Buffalo, sil. 1.75 to 2.25..	21.78
†Buffalo, sil. 2.25 to 2.75..	22.28
East Penn., sil. 1.75 to 2.25..	\$24.15 to 24.65
East Penn., sil. 2.25 to 2.75..	24.65 to 25.15
Va., sil. 1.75 to 2.25.....	26.91
Va., sil. 2.25 to 2.75.....	27.41
Ala., sil. 1.75 to 2.25.....	23.41 to 25.27
Ala., sil. 2.25 to 2.75.....	23.91 to 25.77

Freight rates: \$4.91 all rail and \$3.78 rail and water from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

\*All rail rate. †Rail and water rate.

**Coke.**—Foundry coke specifications are increasing, indicating a larger iron melt. The New England Coal & Coke Co., the Providence Gas Co. and the Koppers Co.'s New Haven, Conn.,

subsidiary all quote \$11 a ton, delivered within a \$3.10 freight rate zone. Warm weather the past week caused a drastic slump in retail buying of domestic coke, yet there was no check in the movement from ovens to yards. New England ovens are still meeting stiff competition from plants located elsewhere.

**Old Material.**—A further recession in the movement of old material out of New England is noted. Prices for specification pipe, T and girder rails and mixed borings and turnings have declined. The market for forge scrap is firmer on buying for shipment to a Worcester consumer. Exports of scrap is still held up by a scarcity of steamship space.

**Buying prices per gross ton, f.o.b. Boston rate shipping points:**

No. 1 heavy melting steel.....	\$10.50 to \$11.00
Scrap T rails.....	10.00 to 10.50
Scrap girder rails.....	9.00 to 9.50
No. 1 railroad wrought.....	11.00 to 11.50
No. 1 yard wrought.....	9.00 to 9.50
Machine shop turnings.....	6.00 to 6.50
Cast iron borings (steel works and rolling mill).....	6.00 to 6.50
Bundled skeleton, long.....	9.00 to 9.25
Forge flashings.....	9.50 to 9.75
Blast furnace borings and turnings.....	5.50 to 6.00
Forge scrap.....	7.00 to 7.25
Shafting.....	14.50 to 14.75
Steel car axles.....	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long).....	9.75 to 10.00
Rails for rolling.....	11.00 to 11.50
Cast iron borings, chemical.....	10.00 to 10.25

**Prices per gross ton deliv'd consumers' yards:**

Textile cast.....	\$14.00 to \$14.50
No. 1 machinery cast.....	15.00 to 15.50
No. 2 machinery cast.....	13.00 to 13.50
Stove plate.....	11.00 to 11.50
Railroad malleable.....	15.50 to 15.75

## Structural Steel Shipments Make New Record

WASHINGTON, Nov. 20.—Orders for fabricated structural steel in October totaled 184,643 tons, or 64 per cent of the monthly capacity of 290,290 tons of the 198 firms reporting to the Department of Commerce. Computed bookings were 240,000 tons. The actual bookings reported were the smallest since January, when the total was 172,284 tons, while the computed orders were the smallest since April, with a total of 236,250 tons. Actual bookings reported in September amounted to 256,811 tons, or 85 per cent of the capacity of the 221 reporting firms, while computed bookings were 318,750 tons.

Computed shipments in October were 330,000 tons, or 88 per cent of estimated total capacity of 375,000 tons for the entire industry. The October computed shipments established a record since the Department began keeping such figures in 1924. Computed bookings for the 10 months ended October totaled 2,797,500 tons, against 2,568,750 tons for the corresponding period of last year, while computed shipments were 2,625,000 tons and 2,407,500 tons respectively.

### Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats.....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot-pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

\*Including quantity differentials.

## Buffalo

### Pig Iron Sold at Recently Advanced Prices—Scrap Slightly Weaker—Steel Mills Busy

BUFFALO, Nov. 20.—Pig iron inquiries in this district totaled between 6000 and 7000 tons. A good deal of iron has been purchased without the formality of an inquiry by melters, who seem convinced the market is firm at present prices. One of the inquiries was for 2500 tons of foundry and malleable; another for 1500 tons of foundry and another for 1000 tons of foundry, all from points eastward. The quotation of \$18, Buffalo, for No. 2 plain for delivery outside this district is being maintained and the malleable for similar delivery is being held at \$18.50. For district delivery \$18.50 is being adhered to for No. 2 plain. Furnace operations are unchanged. Ten furnaces are in blast.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	\$18.00 to \$18.50
No. 2X fdy., sil. 2.25 to 2.75	18.50 to 19.00
No. 1X fdy., sil. 2.75 to 3.25	19.50 to 20.00
Malleable sil. up to 2.25	18.50 to 19.00
Basic	17.50 to 18.00
Lake Superior charcoal	27.28

**Finished Iron and Steel.**—A high rate of operation is being maintained by district mills. Bar and shape prices are firm; specifications are good. Sheets show firmness at the new prices, and bookings assure heavy operation for some weeks. Reinforcing bar business has dropped off; the price is 2.515c., warehouse. Wire sales are keeping mill operations at 75 per cent. Warehouse business has improved steadily.

**Old Material.**—A small tonnage of No. 1 heavy melting steel was purchased by one of the principal users the past week at a price said to have been \$16.50, or 50c. under its larger purchases of a month ago. This is the price also being offered by dealers for delivery to the buyer. Shipments to this interest are still being regulated, but the restrictions are not so severe. Important purchasing by two of the largest plants in the district is expected within a week or two. During the past week there have been some sales of knuckles and couplers and steel car wheels at \$17.50 and a few small sales of No. 1 machinery cast at \$15.75 to \$16. The out-of-town market is not quite so strong and this is reflected in the local market. A smaller demand from Youngstown and Pittsburgh has created a larger supply of No. 2 steel in particular, the

shortage of which has been felt in this district. A blast furnace interest came into the market during the week for borings and turnings, paying \$11 to \$11.50.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$15.50 to \$16.50
No. 2 heavy melting steel	14.25
Scrap rails	15.50 to 16.00
Hydraulic comp. sheets	14.25
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	13.50 to 14.00
No. 1 bushelling	14.50 to 15.50
Hvy. steel axle turnings	13.50 to 14.00
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	14.50 to 15.00
Acid Open-Hearth Grades	
Knuckles and couplers	17.00 to 17.50
Coll and leaf springs	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades	
Short shov. steel turnings	11.00 to 11.50
Blast Furnace Grades	
Short shov. steel turnings	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 12.00
No. 2 bushelling	11.00 to 12.00
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	15.50 to 16.00
Stove plate	14.50 to 14.75
Locomotive grate bars	13.00 to 13.50
Steel rails, 3 ft. and under	17.50 to 18.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Industrial	16.00 to 16.50
Railroad	16.00 to 16.50
Agricultural	16.00 to 16.50

### Department of Commerce to Test Airplane Joints

WASHINGTON, Nov. 20.—A comprehensive investigation of the strength and other properties of all the joints and fittings entering into the construction of the airplane from the standpoints of both safety and efficiency in design has been undertaken by the Aeronautics Branch, Department of Commerce, according to the annual report of the director of aeronautics. It is pointed out that the fuselage of many modern airplanes is constructed of seamless steel tubing welded at the joints and that an accurate knowledge of the strength and other properties of the joints and fittings is essential. Copies of the program, including blue prints of all the proposed joints, were sent to aircraft manufacturers and designers. Comments and criticism were invited.

The replies showed much interest in the investigation and contained many practical suggestions as to additions and modifications to be made in the program. The program includes 134 different joints. In addition to specimens made by cutting and fitting the tubes closely, then welding the joint, a number of joints are

included in which reinforcing members of various kinds are used. The material used for the most of the specimens will be chrome-molybdenum steel. The welding is done in a special jig adjustable to fit any proposed specimen. In order that the operation of making the weld may be uniform for all joints, a procedure control prepared by the American Bureau of Welding will be followed. By systematically varying the design of the joints and noting the effect on the strength, weight, and cost the most efficient types of joints will be determined.

### Fuller & Johnson Mfg. Co. Under New Ownership

Second Ward Securities Co., and the Quarles Co., associated investment security concerns of Milwaukee, have announced the purchase of the Fuller & Johnson Mfg. Co., Madison, Wis., manufacturer of farm engines and small industrial power units up to 20 hp. The capital structure of the concern, the assets of which are valued at \$1,000,000, is being changed to 66,000 shares of common stock without par value, in addition to which there is a first mortgage bond issue of \$290,000. Executive personnel and management will remain virtually unchanged, C. L. McMullen continuing as president. The directorate will be enlarged to include representatives of the securities companies as well as of the Waukesha Motor Co., Waukesha, Wis., which is identified with the transfer. The Fuller & Johnson company for some time has operated under license from the Waukesha company in using the Ricardo high-turbulence cylinder head for internal combustion engines. The Waukesha concern manufactures motor truck, tractor and industrial power units from 25 hp. upward. While the Madison concern will continue to build farm engines, it will greatly develop its line of small industrial engines, supplementing the heavier line made by the Waukesha company. Origin of the Fuller & Johnson company dates back to 1840.

### New Chromium Plating Plant Ready

The Chromium Engineering Corporation of America, with executive offices at 246 Fifth Avenue, New York, announces that its large chromium plating plant at 132-134 West Twenty-second Street, New York, will be open and ready for business Nov. 26. Equipment and facilities large enough to chromium plate anything from a pin to automobile bumpers, radiators, shells, etc., have been provided. It is the intention to handle the chromium plating work for manufacturers and job shops who are not ready to instal their own plating plant. The plant will be operated 24 hr. a day to insure prompt delivery.

### Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$3.60
Black wire, base per 100 lb.	3.75



# Non-Ferrous Metal Markets

## Copper Moderately Active and Firm, Tin Sales Large, Lead Steady with Zinc Quiet and Unchanged

NEW YORK, Nov. 20.

**Copper.**—Buying by domestic consumers has been fairly active the past week, the principal delivery involved being January and February. Some consumers are also buying considerable December metal, which is regarded as an indication that consumption is increasing, because recently it was thought that they had overbought. There is some interest in March metal, but practically none has been sold. Producers generally are unwilling to sell this position at this time, unless combined with February metal to regular customers. Foreign buying is moderately active, with France and England taking up the slack caused by the strike in the Ger-

### Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig .....	52.00c. to 53.00c.
Tin, bar .....	54.00c. to 55.00c.
Copper, Lake .....	17.00c.
Copper, electrolytic .....	16.75c.
Copper, casting .....	16.00c.
Zinc, slab .....	7.25c. to 7.75c.
Lead, American pig .....	7.25c. to 7.75c.
Lead, bar .....	9.00c. to 10.00c.
Antimony, Asiatic .....	12.50c. to 13.50c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure) .....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy .....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade .....	30.00c. to 40.00c.
Solder, ½ and ½ .....	33.00c. to 34.00c.

### Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig .....	55.75c.
Tin, bar .....	57.75c.
Copper, Lake .....	17.00c.
Copper, electrolytic .....	17.00c.
Copper, casting .....	16.75c.
Zinc, slab .....	8.00c.
Lead, American pig .....	6.85c. to 7.10c.
Lead, bar .....	9.50c.
Antimony, Asiatic .....	16.00c.
Babbitt metal, medium grade .....	18.75c.
Babbitt metal, high grade .....	59.25c.
Solder, ½ and ½ .....	33.50c.

### Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

<b>Sheets—</b>	
High brass .....	20.25c.
Copper, hot rolled .....	25.00c.
Copper, cold rolled, 14 oz. and heavier .....	26.25c.
<b>Seamless Tubes—</b>	
Brass .....	25.12½c.
Copper .....	26.00c.
<b>Brazed Brass Tubes .....</b>	<b>28.25c.</b>
<b>Brass Rods .....</b>	<b>18.00c.</b>

### From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks .....	10.00c. to 10.50c.
Zinc sheets, open .....	11.00c. to 11.50c.

## THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Nov. 20	Nov. 19	Nov. 17	Nov. 16	Nov. 15	Nov. 14
Lake copper, New York .....	16.12½	16.12½	16.12½	16.12½	16.12½	16.12½
Electrolytic copper, N. Y. ....	15.75	15.75	15.75	15.75	15.75	15.75
Straits tin, spot, N. Y. ....	51.12½	50.37½	50.37½	50.12½	50.00	50.05
Lead, New York .....	6.35	6.35	6.35	6.35	6.35	6.35
Lead, St. Louis .....	6.17½	6.15	6.15	6.20	6.20	6.20
Zinc, New York .....	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis .....	6.25	6.25	6.25	6.25	6.25	6.25

\*Refinery quotation; delivered price ¼c. higher.

man metal trades. Prices continue firm at 16c. for electrolytic copper delivered in the Connecticut Valley and at 16.25c. c.i.f. usual European ports. The Lake copper market is very quiet but firm at 16.12½c., delivered.

**Tin.**—At 1200 tons sales were fairly large for the week ended Saturday, Nov. 17. The deliveries named were all the way from spot to June. Consumers were quite active in their purchases of spot and distant deliveries, while dealers took the intermediate positions, including November and December. Yesterday the market was again active, with consumers taking about 500 tons, and today buying has been fairly liberal, with 400 to 500 tons changing hands. The announcement of the price of tin plate has been one cause of the greater activity on the part of consumers, it usually being their custom to buy after this matter

is settled. Spot Straits tin today was quoted at 51.12½c., New York, and London prices were about £2 per ton higher than a week ago, with spot standard quoted £231 17s. 6d., future standard at £227 15s. and spot Straits £232. The Singapore price today was £230 10s. Arrivals thus far this month have been 2550 tons with 6040 tons afloat.

**Lead.**—Producers report a good volume of sales, particularly in the West where prices are a little easier. Yesterday lead changed hands at 6.15c., St. Louis, but today the market is firmer at 6.17½c. December delivery is principally involved. Large interest centers in the formation last week of the Lead Industries Institute and the effect this may have on steadying the market.

**Zinc.**—This market is featureless with buying reported as moderately

## Non-Ferrous Rolled Products

Mill prices on lead full sheets, having remained at one level since May 29, were advanced ¼c. per lb. on Nov. 15, and are now quoted at 10.25c. to 10.50c., base. Prices on brass and copper products and zinc sheets have not changed.

### List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

<b>Sheets—</b>	
High brass .....	20.50c.
Copper, hot rolled .....	25.00c.
Zinc .....	9.75c.
Lead (full sheets) .....	10.25c. to 10.50c.
<b>Seamless Tubes—</b>	
High brass .....	25.37½c.
Copper .....	26.37½c.

<b>Rods—</b>	
High brass .....	18.25c.
Naval brass .....	20.25c.

<b>Wire—</b>	
Copper .....	17.87½c.
High brass .....	21.00c.
Copper in Rolls .....	24.00c.
Brazed Brass Tubing .....	28.50c.

### Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide .....	33.00c.
Tubes, base .....	42.00c.
Machine rods .....	34.00c.

## Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible .....	13.75c.	15.00c.
Copper, hvy. and wire .....	13.50c.	14.50c.
Copper, light and bottoms .....	11.50c.	12.75c.
Brass, heavy .....	7.75c.	9.00c.
Brass, light .....	6.50c.	7.50c.
Hvy. machine composition .....	10.50c.	11.50c.
No. 1 yel. brass turnings .....	9.25c.	9.875c.
No. 1 red brass or compos. turnings .....	9.50c.	10.50c.
Lead, heavy .....	5.00c.	5.50c.
Lead, tea .....	3.75c.	4.25c.
Zinc .....	3.25c.	3.625c.
Sheet aluminum .....	13.00c.	15.00c.
Cast aluminum .....	11.75c.	13.50c.

## Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

<b>Sheets—</b>	<b>Base per Lb.</b>
High brass .....	20.50c.
Copper, hot rolled .....	25.00c.
Copper, cold rolled, 14 oz. and heavier .....	27.25c.
Zinc .....	10.00c.
Lead, wide .....	9.75c.
<b>Seamless Tubes—</b>	
Brass .....	26.87½c.
Copper .....	27.87½c.
<b>Brass Rods .....</b>	<b>18.25c.</b>
<b>Brazed Brass Tubes .....</b>	<b>28.50c.</b>

active the past week or so. Quotations continue remarkably firm at 6.25c., East St. Louis, or 6.60c., New York, for prime Western for delivery into January and possibly into the first quarter. The price of ore at Joplin was unchanged Saturday at \$40 per ton and statistically the market has slightly improved. For the third successive week the output was 11,000 tons and shipments were larger at over 12,800 tons.

**Antimony.**—Chinese metal in a very quiet market is quoted today at 10.25c., duty paid, New York, for all positions.

**Nickel.**—Wholesale lots of ingot nickel are quoted unchanged at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

**Aluminum.**—Virgin metal, 98 to 99

per cent pure, is quoted at 23.90c. per lb., delivered.

#### Non-Ferrous Metals at Chicago

CHICAGO, Nov. 20.—Spot sales of tin are in good volume and purchases of copper are active. Prices for tin are higher. The old metal market is steady and sales are moderately active.

*Prices, per lb., in carload lots:* Lake copper, 16.75c.; tin, 51.12½c.; lead, 6.25c.; zinc, 6.35c.; in less-than-carload lots; antimony, 11c. On old metals we quote copper wire, crucible shapes and copper clips, 12.50c.; copper bottoms, 11.25c.; red brass, 10.75c.; yellow brass, 8.25c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 27c.; tin foil, 27c.; block tin, 39c. aluminum, 12c., all being dealers' prices for less-than-carload lots.

was for oil storage tanks; 3527 tons for refinery materials and equipment; 1804 tons for tank cars; 1861 tons for gas holders; 2435 tons for blast furnaces, and 26,895 tons for stacks and miscellaneous purposes.

Orders in September totaled 40,281 tons. For the 10 months ended with October bookings were 444,339 tons, or 55.9 per cent of capacity, against 434,708 tons, or 54 per cent of capacity, for the corresponding period of last year.

#### Freight Rate Decisions

WASHINGTON, Nov. 20.—Rates on iron and steel sheets and plates, in carloads, from Middletown, Ohio, to destinations in Missouri, Oklahoma, Arkansas and Louisiana are not unreasonable or unduly prejudicial, according to a decision made public last Saturday by the Interstate Commerce Commission, which ordered dismissal of a complaint by the American Rolling Mill Co. Present rates from Middletown are from 3c. to 6.5c. per 100 lb. higher than those applicable from Cincinnati, while the rates prescribed in the Southwestern cases are from 4c. to 5c. higher.

The rate on pig iron, in carloads, from Duluth, West Duluth, Minn., and Superior and Ashland, Wis., to Lincoln, Neb., was reduced to \$5.27 per gross ton, minimum 60,000 lb. per carload, from \$5.71, minimum 49,280 lb., in a decision of the Interstate Commerce Commission, made public last Saturday. Reparation was also awarded to the complainant, the Cushman Motor Works, Lincoln. The new rate is to become effective Jan. 10.

#### Mackintosh-Hemphill Will Build Plant in Ohio

The Mackintosh-Hemphill Co., Pittsburgh, has placed a contract with the Hughes-Foulkrod Co., Pittsburgh, for the construction of a new plant at Wooster, Ohio. When completed, it will house the heavy equipment formerly located in the Pittsburgh plant on Twelfth Street, which was sold a few months ago to the Pennsylvania Railroad for increased terminal facilities. The new building will be of steel frame construction and will require approximately 400 tons of structural steel.

As a final step in the consolidation of the Bucyrus Co., South Milwaukee, with the Erie Steam Shovel Co., Erie, Pa., under the title of Bucyrus-Erie Co., it is announced that the sales offices of the Erie division are being transferred to South Milwaukee, where the executive offices were consolidated some time ago. It is stated by G. A. Morison, secretary of the Bucyrus-Erie Co., that there is no intention of stopping or reducing production at the Erie works, which will be continued as the eastern manufacturing unit.

## World Trade Passes Pre-War Volume

### Exports of 82 Countries Expanding at One-Half Ante-Bellum Rate

EUROPE has increased its foreign trade more rapidly than any other quarter of the world during the last two years and has now made up all but 10 per cent of the volume of export trade it carried on in 1913. Export growth throughout the world, according to the National Foreign Trade Council, represents a resumption of progress at a little more than half the pre-war rate of increase.

Exports in 1927 for 82 nations conducting 95 per cent of the world's trade, the council states, amounted to \$22,664,000,000 at the 1913 value of the dollar. This figure is about half of what the world's trade would have amounted to had its normal growth been uninterrupted by the war. Between 1900 and 1913 these nations made an annual average growth in exports of 6½ per cent, which would have made their exports last year in normal circumstances a little more than \$44,000,000,000 at the 1913 dollar valuation. The accumulated sum by which the world's exports have, during the past 14 years, fallen short of this normal progress is estimated at about \$145,000,000,000 in 1913 dollars, or more than \$200,000,000,000 today. This total, more than 10 times the debt of the United States, is the cost to world trade of the economic dislocation that accompanied and followed the Great War.

Two years ago the council called attention to the fact that in 1925 for the first time since the war international trade, as measured in exports, had surpassed its volume for 1913. The combined nations, other than the United States, had then made a gain of about 4 per cent, while the United States had made an advance of over 31 per cent.

The figures for 82 nations now disclose an even more satisfactory picture for 1927. They show a real growth of 11 per cent in exports over 1913 for the rest of the world and a

gain of 38 per cent for the United States.

As was inevitable, the recovery of the European nations, now in full swing, has stimulated their exports at a more rapid rate than our own during the last two years. The 27 nations of Europe gained 10 per cent in exports during this interval and have practically attained again the momentum of their pre-war growth. The United States gained about 5 per cent between 1925 and 1927. The significant fact is, however, that the world as a whole, with a real export increase of 6 per cent during the two years, definitely embarked on a new growth in international trade at about half the rate of progress it made before the war.

#### New Weirton Open-Hearth Ready for Operation

The Weirton Steel Co. has completed and is drying out its No. 12 open-hearth furnace, a 300-ton unit, which will be started early next month. The addition of this furnace will give the company an annual ingot capacity of 1,250,000 tons.

#### Fabricated Plate Orders Unusually High

WASHINGTON, Nov. 20.—Aggregating 60,482 tons, or 75.7 per cent of the monthly capacity of the 51 concerns reporting to the Department of Commerce, orders for fabricated steel plate in October were the highest since March, 1923, when they amounted to 72,509 tons, or 89.3 per cent of capacity, the highest on record since the Department of Commerce has been receiving the figures. The next highest total was in January, 1923, with orders for 62,892 tons, or 77.5 per cent of capacity.

Of the October orders, 23,960 tons



## PERSONAL

W. M. GARRIGUES, for the past seven years assistant general manager of sales for the Central Alloy Steel Corporation, Massillon, Ohio, and its predecessor, has been appointed general sales manager of the company. M. H. SCHMID, for two years assistant sales manager alloy division, has



W. M. GARRIGUES

been made sales manager bar and billet division, and J. S. ANDREWS, formerly assistant district sales manager at Detroit, has been named assistant sales manager sheet and strip division, with headquarters at Massillon.

JOHN A. FITZGERALD, for a number of years associated with Remington-Rand, Inc., Ilion, N. Y., has resigned to become sales manager of the Federal Cash Register Co., Kansas City, Mo.

H. W. KNAPP, St. Louis district sales manager for the McQuay-Norris Mfg. Co., maker of piston rings, has been appointed general sales representative for the entire country, and will continue to maintain his headquarters at the company's general offices in St. Louis. He has been identified with the organization since 1915.

ALFRED C. HOWELL, who some months ago resigned the presidency of the Ames Shovel & Tool Co., Boston, to become associated with the Guaranty Trust Co., New York, has been appointed a vice-president of that company. He began his business career with the Carnegie Steel Co. at Pittsburgh and Cincinnati and later became manager of the steel department of the W. Bingham Co., Cleveland. Subsequently he became a sales manager of the Midvale Steel & Ordnance Co., Philadelphia, and when that company became a part of the Bethlehem Steel Corporation he remained as sales manager of the plate department.

J. H. CHUBB has been appointed manager service bureau, Pennsylvania-Dixie Cement Corporation, with headquarters at 131 East Forty-sixth Street, New York. Mr. Chubb, who is a member of the Western Society of Engineers, the American Concrete Institute and the American Society for Testing Materials, has been active in the work of the committee on technical problems of the Portland Cement Association.

LUCIEN EATON, superintendent of the Ishpeming, Mich., district of the Cleveland-Cliffs Iron Co., Cleveland, has been appointed chairman of the metal mining branch, standardization division, American Mining Congress.

A. W. KOEHLER, who has recently served as executive secretary of the safety council of the Rochester, N. Y., Chamber of Commerce, has been appointed secretary of the National Conference on Street and Highway Safety. Mr. Koehler was graduated from Purdue University in 1916 and was for several years identified with accident prevention and industrial relations work for the Commonwealth Steel Co., Granite City, Ill., and the Atlantic Steel Co., Atlanta, Ga.

R. M. SANDBERG, for 16 years associated with the Columbia Tool Steel Co., Chicago Heights, Ill., has been appointed general manager of that company. In recent years he has been active in the work of the American Society for Steel Treating.

A. J. GATES has been appointed chief sales executive of the Baker-Raulang Co., Cleveland, and will have charge of the distribution of the company's industrial tractors, trucks and cranes. He has been associated with the company for the last 10 years, having had charge of the Ohio and Michigan territory. Mr. Gates was graduated from Purdue University in 1908, and before joining the Cleveland company he was connected with the General Electric Co.

FRANK J. BAUMIS has resigned as president Shaw Crane-Putnam Machine Co., Inc., and as vice-president and director of Manning, Maxwell & Moore, Inc., New York, to become associated on Dec. 1 with the Ingersoll-Rand Co., New York. In his new capacity Mr. Baumis will be identified with the development of the oil-electric locomotive.

PHILIP DRESSLER has been elected president of the American Dressler Tunnel Kilns, Inc., Cleveland, succeeding the late E. H. SWINDELL. He is a son of CONRAD DRESSLER, inventor of the Dressler muffle kiln, and has been actively identified with the American branch of the company

since its inception. PAUL A. MEEHAN, vice-president in charge of engineering for the company, has been elected treasurer but will continue to hold his old position. L. A. VINCENT, associated with the company for eight years, has been named vice-president in charge of sales.

HERBERT W. STONE, vice-president and general manager of the United States Hoffman Machinery Corporation, Syracuse, N. Y., has been elected president of that company, succeeding the late EUGENE D. STOCKER.

DAVID C. PARK has been made president and treasurer of Smith & Caffrey, Inc., Syracuse, N. Y., structural steel fabricator, GEORGE G. HEIDLAUF, vice-president, and FRANK B. FLOYD, secretary. The men were directors of the company prior to the death this year of William Blackwood Smith and James A. Caffrey and all have been associated with the firm for many years. Mr. Park went to work as an office boy with Smith & Caffrey, Inc., 31 years ago, and Mr. Heidlauf began work in its foundry department 34 years ago, having been in charge of ornamental iron production for the last 20 years. Mr. Floyd, who is a structural engineer, went with the company 17 years ago and was previously associated with the McClintic-Marshall Co., Pottstown, Pa., and the American Bridge Co., Elmira, N. Y.

L. S. SHAFFER, recently general manager Byers Machine Co., Ravenna, Ohio, has become associated with the C. O. Bartlett & Snow Co., Cleveland, and will be in charge of the sale and development of a truck body, for the transportation of pre-mixed cement, which the company is now building. The sale of this body will be handled outside the regular Bartlett & Snow sales organization, the present plan being to distribute the product through dealers in contractors' equipment and motor truck manufacturers.

B. J. STEELMAN, for a number of years associated with the Wanner Malleable Castings Co., Hammond, Ind., has been made manager of the Kalamazoo, Mich., branch of the Wanner Malleable Iron Co., Decatur, Ill.

ROBERT P. KING, since 1916 works engineer at the Springfield, Mass., plant of the Westinghouse Electric & Mfg. Co., will become associated with the engineering department of the Dupont Rayon Co., Buffalo, N. Y., on Dec. 1. Mr. King is a member of the Cornell Society of Engineers, a director and chairman of the finance committee of the Engineering Society of Western Massachusetts and a past-president of the Springfield section of the American Institute of Electrical Engineers. He was graduated from Cornell University in 1912.

THEODORE C. WILSON, recently associated with E. Arthur Tutein, Inc., Boston, and previously with F. O. Henshaw, Boston, has been made pig

iron representative of the Donner Steel Co., Inc., Buffalo, in the New England territory.

H. S. DURANT, for a number of years manager of the cold-rolled strip and spring department, American Steel & Wire Co., Chicago, has resigned. He has been succeeded by A. J. HESS, who has been acting as assistant manager of that department.

T. E. DAVIS has been elected president of the Caldbeck Tool & Mfg. Co.,

Des Moines, Iowa, succeeding the late WENDELL H. CALDBECK. R. J. BENNETT has been named vice-president and general manager; EDITH CALDBECK, treasurer, and K. H. PETERSON, secretary.

JOHN A. MARR, for 10 years superintendent of the Nugent Steel Casting Co., Chicago, has been appointed works manager of the Chicago Steel Foundry Co., Kedzie Avenue and Thirty-seventh Street, Chicago.

associated with a sewing machine manufacturer, working up to sales manager of the New England territory. In 1892 he became affiliated with a shoe machinery maker, and was instrumental in the formation of the United Shoe Machinery Corporation. EDWARD P. BROWN, his son, is president of that company.

HARRY G. O'BRIEN, for 50 years an active figure in the iron and steel industry in the Pittsburgh district, died at the home of his daughter in Pittsburgh Nov. 14. He was born in that city 70 years ago, and as a boy went to work in the mills of Clark Sons & Co., which later became the Clark mills of the Carnegie Steel Co. He became superintendent of that plant but left that position to become manager of the Fort Pitt Malleable Iron Co., McKees Rocks, Pa. Later he was with the American Steel Co. and the Seaman-Sleeth Co. in sales capacities and then returned to operating work as superintendent of the mills of the Superior Steel Corporation. He joined the Trumbull Steel Co., Warren, Ohio, as superintendent of the strip mill when that company entered that branch of the business. Later he served as general manager of its special products division. For the past few months he had been in the sales department of the Pittsburgh Rolls Corporation.

WALTON HARVEY MEAGLEY, assistant sales manager of the Corbin Screw Co., New Britain, Conn., died suddenly, Nov. 11, at his home in Berlin, Conn. He was born at Binghamton, N. Y., 50 years ago, and had been associated with the New Britain company for more than 25 years.

SIDNEY JOHNSTON JENNINGS, vice-president United States Smelting, Refining & Mining Co., New York, and a past-president of the American Institute of Mining and Metallurgical Engineers, died on Nov. 17, at his home in New York. He was born at Hawsville, Ky., in 1863, and was graduated from Harvard University in 1885. After serving as a surveyor and engineer for the Anaconda Copper Co. in Montana, he went to South Africa, where he was active in a number of large mining projects. In 1907 he became associated with the United States company, serving it until the time of his death. As president of the Mining Engineers during the World War he took an active part in the working out of Government engineering projects and the manufacture of war supplies. In 1922-23 he served as president of the American Mining Congress. At the time of his death he was also president of the Hanover Bessemer Iron & Copper Co. and a director of Cia. de Real del Monte y Pachuca.

JOHN G. WAY, for 20 years general manager of the New Process Stove Co., Cleveland, and a director of the American Stove Co., died suddenly Nov. 18, as the result of a heart attack. He was 55 years of age and had been connected with the company 33 years.

## OBITUARY

FREDERICK KENT COPELAND, president Sullivan Machinery Co., Chicago, whose sudden death at Claremont, N. H., on Nov. 10, was mentioned in THE IRON AGE last week, was stricken while visiting the company's plant in



F. K. COPELAND

the latter city. The founder in 1884 of the Diamond Prospecting Co., which at that time was engaged in contracting work in the West with diamond core drills made by the Sullivan Machine Co. at Claremont, he was instrumental in bringing the two companies together in 1892 and had served as president of the combined corporation since that time. During his long and active business and engineering career Mr. Copeland had built up a wide reputation for leadership and vision.

J. W. OLIVER, first vice-president and chairman of the executive committee of the Standard Sanitary Mfg. Co., Pittsburgh, died at his home in Sewickley Heights, Pa., Nov. 13. In 1903 he entered the employ of Ahrens & Ott Mfg. Co., Louisville, Ky., the plant of which is now the Louisville works of the Standard company. In 1911 he was made assistant manager and two years later manager of this plant. In 1918 he was advanced to general manager of the Ahrens & Ott division of the company and the following year was elected secretary-treasurer, with headquarters in Pittsburgh. He held that position until

early in 1924, when he was elected to the offices he held at the time of his death. Mr. Oliver was born in Elmira, Ill., 56 years ago, and was graduated from Iowa State College in 1895. He also completed a course in the Chicago College of Law and was admitted to the bar in the State of Illinois, but followed the legal profession for only a brief period. While a resident of Louisville Mr. Oliver served two terms as president of the Louisville Board of Trade. He was chairman of the Louisville War Industries Commission during the World War, and was a director of the Louisville Million Dollar Industrial Foundation.

CHARLES BRUCE WHITE, Chicago representative of the Cochrane Corporation, Philadelphia, manufacturer of steam power plant equipment, and vice-president and general manager of the Cochrane Engineering Co., Chicago, died at his home in the latter city on Oct. 16. He was born at Black Rock, Nova Scotia, in 1864, and received his early technical training at Boston, later becoming identified with the Thomson-Houston Electric Co., West Lynn, Mass. In this capacity he had charge of the building of some of the first electric railroads in the South. In 1898 he went to Chicago as chief electrician of the Calumet Street Railway Co. and later became associated in a sales capacity with the Western Electric Co. In 1900 he became St. Louis branch manager for the Sprague Electric Co., and the following year became identified with A. Sorge, Jr., & Co., then representatives in Chicago for the Harrison Safety Boiler Works, predecessor of the Cochrane Corporation. At the death of Mr. Sorge seven years ago he became vice-president and general manager of the Cochrane Engineering Co., which succeeded the Sorge company.

GEORGE W. BROWN, vice-president of the United Shoe Machinery Corporation, Boston, and for many years purchasing agent, died in Newton, Mass., on Nov. 16. He was born at Northfield, Vt., Aug. 30, 1841, and at the age of 18 became connected with a railroad company. Later he went into the grocery business and subsequently into hardware. He was then



# Machinery Markets and News of the Works

## Business Is Less Active

November and December Are Usually Months of Declining Orders, Says Machine Tool Association

**A**LTHOUGH machine tool business in November probably will not equal that of October, the volume has not dropped off materially and the prospects are promising for a better-than-average demand for tools during the remainder of the year. The monthly review by the National Machine Tool Builders' Association says "there is generally some seasonal recession in the last two months of each year," but the association does not expect any considerable falling off this year.

The index of machine tool orders indicates a larger business in October than in September. The October figure was 263.5, compared with 236.8 in September, 100 representing the average for 1922, 1923 and 1924.

With unfilled orders increasing on the books of machine tool builders, the supply of skilled labor becomes an important factor in the ability to make deliveries. Many shops are working overtime to meet the demand.

A favorable factor is that inquiries have not fallen off greatly. Some of the current inquiries are believed to be predicated on plans of industrial companies for next year. Purchases are frequently held down prior to the annual inventory period, but are resumed when this operation has been completed.

Chicago continues to report an active demand from manufacturers of tractors and other farm machinery. The J. I. Case Threshing Machine Co., Racine, Wis., has ordered \$50,000 worth of tools and the Allis-Chalmers Mfg. Co. has bought for its Springfield, Ill., tractor plant. The International Harvester Co. is buying against a list for its Fort Wayne, Ind., plant.

The Pratt & Whitney Co. has received orders for two lists of tools, one of 18 items and the other of 14.

Quotations are being received by the Fox Brothers International Corporation, New York, on a list of tools for shipment to Colombia.

two 13-in., four 16-in. and one 20-in. lathes, No. 2 jig boring machine, four die sinking machines, bench lathe, drill and milling machine. Sales reported during the week by Niles-Bement-Pond Co. included six high-speed tappers, No. 110 Ransom grinder, 24-in. Aurora drill, 4½-ft. Morris radial drill, 18-in. x 8-ft. Boye & Emmes lathe, 1½-in. Acme forging machine, extra heavy 42-in. rotary planer, four-spindle heavy mud ring drill and a No. 7 carbox boring machine.

Tide Water Oil Co., 11 Broadway, New York, has plans for addition to storage and distributing plant at Nyack, N. Y., to cost about \$35,000 with equipment.

Garford Motor Truck Co., Thirteenth Avenue and William Street, Long Island City, with main plant at Lima, Ohio, has plans for a two-story addition to local branch for service and repairs, 100 x 215 ft., to cost over \$100,000 with equipment. Frank S. Parker, 119 West Fifty-seventh Street, New York, is architect and engineer.

Department of Plant and Structures, Municipal Building, New York, has filed plans for two-story automobile service, repair and garage building for motor

trucks and cars, 110 x 150 ft., on West Farms Road, Bronx, to cost about \$110,000 with equipment.

Rizzuto Motor Co., Peekskill, N. Y., has awarded general contract to L. Kell Co., 22 Croton Avenue, Ossining, N. Y., for one-story service, repair and garage building, to cost about \$100,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Genfire Steel Co., Youngstown, Ohio, manufacturer of steel windows and other steel building products, has concluded merger with Fireproof Products Co., Inc., 536 East 133rd Street, New York, manufacturer and distributor of kindred specialties. Latter company will operate in future as New York factory branch of Genfire company, and will expand facilities.

Francis O. Blackwell, president Viele, Blackwell & Buck, 49 Wall Street, New York, consulting engineers; William M. Flook, president American-Brown Boveri Electric Corporation, 420 Lexington Avenue; Thomas W. Streeter, chairman of board Simms Petroleum Co., 120 Broadway, and associates have organized American Cirrus Engines, Inc., to acquire manufacturing, sales and distributing rights of Cirrus aircraft engines in this country, now being produced abroad. New company plans establishment of plant for parts manufacture and assembling.

Independent Cork Co., Inc., Jefferson Crossing, Whippany, N. J., is considering rebuilding main plant unit, 60 x 200 ft., destroyed by fire Nov. 12.

Kolster Radio Corporation, 200 Mount Pleasant Avenue, Newark, has plans for new three-story addition, to cost over \$80,000 with equipment. Company has also acquired existing building near plant for establishment of a radio research and development works, to cost over \$25,000.

Newark Transformer Co., 17 Frelinghuysen Avenue, Newark, manufacturer of electrical transformers, parts, etc., has plans for an addition at 62 Sherman Avenue, to cost about \$35,000 with equipment. J. Kennedy, 44 Grove Street, Kearny, N. J., is architect.

F. J. Mullaney Iron Works, Inc., 574 Twelfth Street, West New York, N. J., is completing plans for new two-story plant, 200 x 200 ft., at North Bergen, N. J., to cost over \$75,000 with equipment. Charles G. Eichholz, Jr., 960 Bergenline Avenue, West New York, is architect.

George B. Steel Co., 370 Colt Street, Irvington, N. J., iron and steel products, has filed plans for one-story storage and distributing plant, 75 x 100 ft., to cost over \$20,000 with equipment.

Borough Council, Highlands, N. J., is asking bids until Nov. 26 for three complete pumping plants and sewage treating plant to cost \$300,000. Remington & Vosbury, 509 Cooper Street, Camden, N. J., are engineers.

Empire State Ice Co., Ninth Avenue

## New York

**N**EW YORK, Nov. 20.—Machine-tool buying and new inquiry continue on a slightly smaller scale, but the railroads and some industrial users of machine tools are beginning to ask for estimating prices to be used in preparing budgets for next year. Among recent inquiries is a list of tools for export to Colombia, asked for by the Fox Brothers International Corporation, New York. The Curtiss Aeroplane & Motor Co., Buffalo, continues as a buyer of machine tools. The General Electric Co., Schenectady, N. Y., has closed on five machines in the past week.

Two sizable lists of machine tools have been placed recently with Pratt & Whitney Co. One list consisted of five 13-in., two 16-in. and one 20-in. engine lathes, bench lathe, No. 2 jig boring machine, 12-in. thread milling machine, two 6-in. and one 12-in. vertical shapers, hob and cutter grinder, two centering machines and a 14-in. vertical surface grinder. Another list consisted of a No. 12 profiler,

## The Crane Market

SEVERAL overhead crane lists are still pending award and one was placed last week. New inquiry is fair, but not expected by most sellers to show much improvement before the end of the year. Moores & Dunford, engineers, New York, inquiring for a list of four 5-ton gantry cranes for the Waterfront Service Corporation, Brooklyn, N. Y., are expected to award the business within the next fortnight. Moderate interest is being shown in locomotive cranes by some

large users, but actual inquiry will probably be early next year.

Among recent purchases are:

United States War Department, Washington, 3-ton, 52-ft. span hand-power crane for shipment to Philippine Islands, from New Jersey Foundry & Machine Co.

Erie Railroad, New York, two 25-ton locomotive cranes from Industrial-Brownhoist Corporation.

Hiller Engineering Co., Brooklyn, six

bucket handling cranes for Brooklyn Ash Removal Co., from a Western builder.

Following recent installations of Cleveland tramrall are reported by Leeds, Tozzer & Co., Inc., 75 West Street, New York, agents: Imperial Laundry Co., Newark, N. J., Ellicon Co., Brooklyn, Consolidated Telegraph & Electrical Subway Co., New York, Canada Dry Ginger Ale Co., Hudson, Otis Elevator Co., Yonkers, American Car & Foundry Co., New York, and Palace Laundry Co., Washington.

and 219th Street, New York, is having plans drawn for an addition, to cost more than \$200,000 with equipment. Wigton-Abbott Corporation, 552 West Twenty-third Street, is engineer.

Petty & Wherry, Inc., 50 Church Street, New York, has been appointed distributor in metropolitan district for Buckwall Engineering Co., Brooklyn, manufacturer of Buckwall sprocket wheel.

American Brass Co., Waterbury, Conn., is rebuilding its electrical cable plant at Hastings-on-Hudson, N. Y., preparatory to production of high quality power cable. Insulating machinery and drying and impregnating apparatus will be installed. A testing laboratory for high tension cable work and examination of insulating oils, paper and cable sheath is also planned. Hastings plant was formerly operated by National Conduit & Cable Co. and its annual capacity of non-ferrous products is approximately 100,000,000 lb.

Although plant and general offices of De La Vergne Machine Co. have moved from New York to Philadelphia, company still maintains an office at 100 Broadway, New York.

American Electric Switch Corporation, Minerva, Ohio, has discontinued connection with Holland & Monaghan and now has direct factory representative in metropolitan district with office and warehouse at 430 East Fifty-third Street in charge of G. N. Lindstrom.

## New England

BOSTON, Nov. 19.—Although sales in most cases involved only single items, in general, business again was good the past week. It included a variety of new as well as of used machinery for prompt delivery. Most of the buying is for increasing output or for reducing costs rather than for plant extensions. The Atlantic Works, East Boston, has bought wood-working and pipe shop equipment and will, it is expected, close on machine shop requirements this week.

New inquiries for single high-production tools are in fairly satisfactory volume and it is the belief in the local machine-tool trade that New England industries will require much equipment early next year.

Leading manufacturers are increasing production in an effort to keep up with bookings. General Electric Co., Pittsfield, now has 6500 workers on its payroll, an increase of 200 since Nov. 1, and of 600 within a year. Textile machinery makers are employing many more than three months ago. It is possible Draper

Corporation, Hopedale, Mass., will establish an assembling plant in the South early in 1929. Machine tool manufacturers, especially those in Worcester and Hartford, are adding night shifts as fast as skilled workmen are available. Makers of paper, sugar and rubber machinery, and of heaters and coal and gas ranges, are doing a better business than in several months, and the outlook for 1929 is encouraging.

Charles H. Lockwood, 171 Westminster Street, Providence, architect, has completed plans for a two-story addition, 40 x 49 ft., and 30 x 30 ft. for a jewelry manufacturer, owner's name withheld.

Milton Bradley Co., Springfield, Mass., has purchased from Nilco Lamp Works, Inc., Emporium, Pa., two four-story and two two-story manufacturing units on Wilbraham and Waltham Roads, Springfield, to manufacture toys.

Construction has been begun by Abertaw Co., Boston, on new feldspar grinding plant for American Mineral Products Co., Inc., at Cold Village, town of Walpole, N. H. Plant will include three connected units, about 60 x 230 ft.

Contract has been let by Brown & Sharpe Mfg. Co., Providence, to Central Engineering & Construction Co., 20 Bond Street, Holyoke, Mass., for one-story foundry addition, to cost about \$45,000 with equipment. Jenks & Ballou, Grosvenor Building, are engineers.

Linstrom Sign Co., 115 First Street, Cambridge, Mass., has removed to a new location on Western Avenue, formerly occupied by Federal Iron Works, and will expand operations.

Berenson & Moses, Hartford, Conn., architects, have plans under way for three-story and basement automobile service, repair and garage building, 70 x 140 ft., to cost over \$100,000 with equipment.

Uncas Mfg. Co., 85 Sprague Street, Providence, manufacturer of jewelry, has filed plans for a two-story addition, to cost over \$40,000 with equipment.

Moore Drop Forge Co., Springfield, Mass., has awarded general contract to Adams & Ruston Construction Co., 1387 Main Street, for two-story addition, to cost more than \$45,000 with equipment.

Container Corporation of America, 111 West Washington Street, Chicago, has purchased plant and business of Corrugated Paper Mills Co., Natick, Mass., and will operate as branch mill. Company is also starting a new mill at Bridgeport, Conn.

Johnson Steel & Wire Co., Inc., Worcester, is erecting a one-story addition, 60 x 233 ft., which will more than double present capacity. New building will house additional equipment for drawing high-carbon steel wire, including tire, rope and music wires.

National Foundry & Machine Co.,

Worcester, manufacturer of wire-drawing dies, is erecting a building, 40 x 80 ft., to take care of increasing business.

Precision Casting Co., Syracuse, N. Y., has acquired controlling interest in P. & R. Tool Co., Inc., 100 Lamartine Street, Worcester, Mass., and will move business to Cleveland, where a building is being erected for branch plant. P. & R. Co. builds Lester die-casting machine and dies. Nathan Lester, manager, will be connected with Cleveland plant.

M. C. Wright Co., Worcester, Mass., manufacturer of vacuum cleaners, has been reorganized under management of Dwight C. Daniels, who has resigned as production manager of machine division of Norton Co. Directors include F. Harold Daniels, president and general manager Riley Stoker Corporation. Officers are: President, Henry H. Wright; treasurer, E. Stanley Wright; secretary, Clifford L. Wright, and vice-president and assistant treasurer, Clayton M. Wright.

## Philadelphia

PHILADELPHIA, Nov. 19.—Plans have been filed by International Harvester Co., 2905 North Sixteenth Street, Philadelphia, for two-story service, repair and sales building, 110 x 225 ft., for motor truck division, on site lately purchased, to cost \$140,000 with equipment. Headquarters are at Chicago.

Nathan and Harry Alterman, 3115 West Cumberland Street, Philadelphia, have organized Paramount Iron Works to establish a local plant for steel fabricating and iron working, including production of ornamental iron and bronze products, and plan to begin manufacture soon.

Department of City Transit, City Hall Annex, Philadelphia, C. E. Myers, director, will receive bids until Nov. 28 for car, track and electrical equipment, and for a battery charging unit, as per specifications on file.

Sun Oil Co., Finance Building, Philadelphia, has acquired 164 acres in Twin Oaks section, near its refinery at Marcus Hook, Pa., and is said to be planning construction of additional units to cost more than \$500,000.

Standard Wire & Iron Works Co., 1512 North Thirteenth Street, Philadelphia, has purchased two-story factory on Hancock Street, about 8,000 sq. ft. floor space, for expansion.

Ford Motor Co., Detroit, has plans for expansion at its assembling and distributing plant at Chester, Pa., including construction of new units and additional equipment. Works will be developed for a main branch for export business; loading and mechanical handling facilities will be provided at company docks; a



mill will be built for manufacture of wire-bound crates, box materials, etc. Project is reported to cost more than \$500,000.

Central Airport, Inc., care of C. Townsend Ludington, president Ludington Philadelphia Flying Service, Inc., Island Road and Tincum Avenue, Philadelphia, recently organized by Mr. Ludington and associates, has engaged Black & Bigelow, Inc., 551 Fifth Avenue, New York, aero engineer, to prepare plans for airport at Camden, N. J., with shops and other units, to cost more than \$1,000,000 with equipment.

Automotive Rim & Stamping Co., Williamsport, Pa., recently organized by Edwin Wilkinson, 769 West Fourth Street, and associates, with capital of \$100,000, plans early operation of local metal stamping plant and machine shop. George E. Sands, 520 Pine Street, is also interested in company.

Barnard Tractor & Equipment Co., Harrisburg, Pa., has been organized by W. F. Barnard, Camp Hill, Pa., and associates as eastern factory branch and distributing representative for Caterpillar Tractor Co., Peoria, Ill. Company has leased space in building of Oliver Chilled Flow Works, Fifteenth and Mayflower Streets. E. P. Townsend will be manager of new company.

## Milwaukee

**M**ILWAUKEE, Nov. 19.—The machine-tool market is somewhat quieter. A good volume of business, however, continues to develop, sources of orders covering virtually all metal-working lines. Automotive industries, while still in the market, appear to have satisfied their present requirements, many awaiting deliveries before placing new specifications. Local output of tools continues at a high rate, with numerous shops still far behind on deliveries.

Ladish Drop Forge Co., Packard Avenue, Cudahy, Wis., is enlarging its plant for increase in capacity of drop and steam hammer products. Contracts have been placed for a new steel storage building and an extension of steam generating house. Present steel storage area is being converted into shop space. Work is under direction of Battey & Kipp, Inc., consulting engineer, 231 South LaSalle Street, Chicago.

Allis-Chalmers Mfg. Co., Milwaukee, is closing bids for a one-story shop addition, 200 x 600 ft., to its tractor division at main works in West Allis. Plans also are being completed for additions to Monarch tractor division works at Springfield, Ill.

Kwik-Mix Concrete Mixer Co., Port Washington, Wis., manufacturer of small-batch devices, contemplates erection of a new office and warehouse and conversion of space now used for these purposes into manufacturing area.

Rundie Mfg. Co., 1025 Cleveland Avenue, Milwaukee, manufacturer of enameled sanitary ware, has engaged Charles A. Cahill & Sons, consulting engineers, 214 Mason Street, local, to design alterations in its millroom, new equipment to include a rotary drier, one smelter, air preheater, etc.

Zenith Mfg. Co., Racine, Wis., manufacturer of super-power cylinder replacement heads for light cars and other automotive accessories, has purchased plant of Vogue Auto Painting Co. at 326

Thirty-seventh Street, in North Milwaukee, and will not erect a new plant as previously reported. Present shop, 40 x 60 ft., will be enlarged to 60 x 100 ft.

Lakeside Railway Signal Co., Freeport, Ill., has purchased site at Beloit, Wis., and will make an investment of approximately \$200,000 in a one-story shop, 60 x 300 ft., with considerable new equipment. Work is to begin Jan. 1. J. H. Shunk is president.

Wesley Steel Treating Co., 651 South Pierce Street, Milwaukee, engaged in commercial steel treating, has opened branch office at 308 South Fifth Street, Racine, Wis., with J. G. Barr as representative.

## South Atlantic

**B**ALTIMORE, Nov. 19.—Bids will soon be asked by Edward Katzinger Co., 1949 North Cicero Avenue, Chicago, manufacturer of bakers' machinery and tools, for two-story plant at Baltimore, to cost more than \$250,000 with equipment. Lockwood, Greene & Co., 400 North Michigan Avenue, Chicago, are architects and engineers.

American Oil Co., American Building, Baltimore, has awarded general contract to Consolidated Engineering Co., 20 East Franklin Street, for three-story addition to plant in Curtis Bay district, for storage and distribution, to cost \$100,000 with equipment.

Western Electric Co., 195 Broadway, New York, is said to have engaged H. K. Ferguson Co., Cleveland, to prepare plans for initial units of new plant in River View Park section, Baltimore, to cost more than \$5,000,000.

Tudor Ice & Cold Storage Co., Danville, Va., plans new six-story ice-manufacturing and cold storage plant, 120 x 120 ft., to cost over \$115,000 with machinery.

Hydro-Electric Corporation, care of M. E. Marcus, Mutual Building, Richmond, Va., president, is completing plans for hydroelectric generating plant on James River, near Snowden, Va., with initial capacity of 10,000 hp., to cost over \$200,000 with transmission system.

E. R. Taylor Motor Co., LaGrange, Ga., has plans for one-story and basement automobile service, repair and garage building, 100 x 150 ft., to include machine and parts department. Lockwood & Pondstone, Forsyth Building, Atlanta, Ga., are architects.

Chesapeake Paperboard Co., Key Highway and Baltimore & Ohio Railroad, Baltimore, has awarded general contract to Fred Wright Co., 217 North Calvert Street, for two additions, 85 x 178 ft., and 86 x 116 ft., including extensions in machine department, to cost about \$100,000 with equipment.

Sears, Roebuck & Co., Arthington and Homan Avenues, Chicago, have acquired about 20 acres at Alexandria, Va., and are said to be planning new multi-story factory branch and distributing plant, to cost more than \$400,000 with equipment.

South Atlantic Ice Co., Savannah, Ga., recently organized to take over and expand South Atlantic Packing & Provision Co., has plans for three new ice-manufacturing plants in different parts of city, to cost more than \$200,000 with equipment.

John E. Lock & Sons, Lawrence, Mass., manufacturers of bobbins and other textile mill equipment, are arranging to lease

building at Charlotte, N. C., for new branch factory. It is purposed to build a new plant later.

## Chicago

**C**HICAGO, Nov. 19.—In contrast with recent weeks, the machine-tool business is showing rather an uneven tendency. Sales bulk large but are not well distributed. Fresh inquiry continues in satisfactory volume.

J. I. Case Threshing Machine Co., Racine, Wis., has placed orders aggregating over \$30,000, and Allis-Chalmers Mfg. Co. has made purchases for its Springfield, Ill., tractor plant. The list issued for Fort Wayne, Ind., by International Harvester Co. is being closed. The Missouri Pacific has purchased a few items at St. Louis, otherwise railroads are showing little interest in the machine tool market. One of the most active sections is Milwaukee and surrounding territory. Demand for used tools is lighter than at the beginning of the month.

Roesch Enamel Range Co., Belleville, Ill., has purchased property, 100 x 150 ft., and will erect a one-story factory to cost \$40,000.

Pines Winterfront Co., Chicago, has purchased property, 425 x 447 ft., at Cicero and Division Streets, and contemplates erection of an automobile parts manufacturing plant.

Dryden Rubber Co., 1014-22 South Kil-dare Avenue, Chicago, has begun construction of an addition to mechanical rubber goods plant, 85 x 125 ft., to cost more than \$125,000 with equipment.

Nachman-Springfield Co., 2241 South Halsted Street, Chicago, manufacturer of springs, has purchased plants and businesses of National Wire Spring Co. and Marshall Spring Co., Chicago, and will consolidate. All units will be continued in service and expansion developed. Automobile spring manufacture will be concentrated in future at National and Marshall plants, while Nachman-Springfield factory will be used for manufacture of furniture, airplane springs, etc.

Sanitary District of Chicago, 910 South Michigan Avenue, T. J. Crowe, president, will receive bids until Dec. 13 for pumping machinery and auxiliary equipment for Racine Avenue sewage pumping plant, including three motor-driven, vertical shaft centrifugal pumping units, each with output of 300 cu. ft. per sec., and six similar units, capacity 600 cu. ft. per sec.

Russell Grader Mfg. Co., 2037 University Avenue, S. E., Minneapolis, Minn., manufacturer of road-building machinery, has taken bids on general contract for an addition, 75 x 330 ft., to cost about \$60,000 with equipment. Sund & Dunham, Essex Building, are architects.

Albertson & Co., 3100 Floyd Avenue, Sioux City, Iowa, manufacturers of valve tools and kindred products, have begun superstructure for a four-story and basement addition, 40 x 150 ft., to cost more than \$80,000 with equipment. K. E. Westerland, War Eagle Building, is architect.

Stark Co., Marshalltown, Iowa, manufacturer of iron castings, etc., has asked bids on general contract for one-story addition, to cost about \$40,000 with equipment. H. E. Reimer, Kibbey Building, is architect.

City Council, Evanston, Ill., is planning installation of municipal electric light and power plant, to cost more than \$50,000

with equipment. City engineer is in charge.

General Motors Truck Co., Detroit, has leased building to be erected at St. Paul, Minn., for new factory branch, service and repair departments, to cost \$100,000 with equipment. Buechner & Orth, Schubert Building, St. Paul, architects, will take bids on general contract this month.

Material Service Corporation, 111 West Washington Street, Chicago, operating crushed stone plants, sand and gravel properties, etc., has disposed of bond issue of \$1,000,000, a portion of proceeds to be used for expansion, including completion of new sand and gravel plant at Lockport, Ill.

American Coll Spring Co., 1455 West Thirty-seventh Street, Chicago, which is building a new plant at Muskegon, Mich., informs THE IRON AGE that Muskegon project is to be a branch plant and main plant will remain at Chicago.

Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, manufacturer of Thor pneumatic, electric and contractors' tools, will shortly begin erection of an addition to its factory at Aurora, Ill., which will increase present capacity 36,000 sq. ft.

## Gulf States

**B**IRMINGHAM, Nov. 19.—Plans are being arranged by W. D. Haden Co., American National Insurance Building, Galveston, Tex., for new one-story mill, 45 x 350 ft., at Houston, Tex., for production of lime products, using oyster shells as raw material, to cost over \$130,000 with machinery. W. A. Brunet, Houston, is construction engineer, in charge.

Lamson & Sessions Bolt Co., operated by Lamson & Sessions Co., 2188 Scranton Road, Cleveland, for production in Southern territory, has awarded contract to Tennessee Coal, Iron & Railroad Co., Birmingham, for structural steel framing for new plant on 8-acre tract recently secured at North Birmingham, adjoining mill of Birmingham Stove & Range Co. It will cost about \$400,000 with equipment, ultimate project to cost more than \$650,000.

A power house and machine shop will be built by Alabama Braid Co., Gadsden, Ala., in connection with new local textile mill, to cost about \$85,000. Sidney M. Edelstein, 55 West Forty-second Street, New York, and Union, S. C., is architect and engineer.

Morris Lewis, head of Lewis Grocery Co., Lexington, Miss., is at head of project to construct a cold storage plant at Durant, Miss., to cost about \$100,000 with machinery.

Westex Engineering Co., Arian, Tex., has arranged for a change of name to Westex Machine & Tool Co., and increase in capital. Expansion will be carried out.

Ohio Oil Co., Findlay, Ohio, is reported planning construction of oil refinery near Del Rio, Tex., to cost more than \$200,000 with machinery.

Atlantic Pipe Line Co., subsidiary of Atlantic Refining Co., 260 South Broad Street, Philadelphia, has begun construction of new pipe line from Midland to Port Arthur, Tex., to cost more than \$1,000,000 with booster stations and other operating facilities.

Alabama Power Co., Birmingham, is said to be planning construction of new steam-operated electric generating plant near Mobile, Ala., for service at new mill of International Paper Co., now in course

of building, to cost more than \$500,000 with equipment and transmission lines.

Florida Portland Cement Co., Tampa, Fla., with limestone quarries at Brooksville, contemplates an addition to double present output, to cost more than \$300,000 with kiln and auxiliary machinery.

In connection with extensions of line from Port Arthur to Grayburg, Bragg and vicinity, by way of Beaumont, Tex., Waco, Beaumont, Trinity & Sabine Railway Co., Trinity, Tex., is planning construction of new engine house and locomotive repair shops at Beaumont, to cost over \$100,000 with equipment. Company will issue \$3,000,000 in bonds and \$901,500 in stock, part of fund to be used for expansion.

Swift & Co., Union Stock Yards, Chicago, meat packers, have awarded general contract to Smallman Construction Co., 1109 South Fifth Avenue, Birmingham, for new three-story produce and packing plant at West Point, Miss., 75 x 127 ft., with cold storage and refrigerating department, and isolated steam power plant, 18 x 159 ft.

## Cleveland

**C**LEVELAND, Nov. 19.—Business with machine-tool dealers is fair, but not quite up to last month. However, there has been no falling off in inquiry, which is very good. Tool-room equipment is more active than production machinery. The bulk of business is coming directly or indirectly from the automotive industry. A local manufacturer of turret lathes reports that its November sales have exceeded those during the corresponding period in October. This company has increased production to such an extent that it can make slightly better deliveries than a month ago.

Cleveland Planer Co. reports recent sales of open side planers to Hutto Engineering Co., Detroit; Federal Machine & Welder Co., Warren, Ohio; R. H. Freitag Machine Co., Akron, Ohio, and to a Cleveland steel plant.

Following recent acquisition of aircraft plant of Glenn L. Martin Co., Cleveland, by Great Lakes Aircraft Corporation, purchasing company has arranged for sale of 200,000 shares of stock, portion of proceeds to be used for property purchase and facilities for production of commercial airplanes, including those for mail, express and passenger service. Plant heretofore has been devoted to aircraft for military and naval use. William R. Wilson is president.

Chevrolet Motor Co., West Grand Boulevard, Detroit, has work under way on enlargements in plant at Toledo, Ohio, devoted primarily to production of transmissions and kindred parts, to cost more than \$100,000 with equipment.

Docket Window Platform, Inc., Toledo, recently formed by Henry C. Docket and Edward J. Burman, Toledo, to manufacture patented window equipment and affiliated building products, has opened office at 110 Michigan Street, and is considering early construction of local plant.

Falcon Motors Corporation, Elyria, Ohio, affiliated with Willys-Overland Co., Toledo, Ohio, has begun an expansion and improvement program. Considerable part of remodeled plant will be given over to manufacture of coupé bodies for Willys-Knight and Overland cars; another part will be used for light motor truck manufacture.

Hercules Motors Corporation, Canton, Ohio, manufacturer of gas and oil engines, parts, etc., has awarded general contract to A. F. Wendling Co., Massillon, Ohio, for one-story addition, 90 x 100 ft., to be used primarily for testing, to cost about \$85,000 with equipment.

## Buffalo

**B**UFFALO, Nov. 19.—Buffalo, Rochester & Pittsburgh Railroad Co., Rochester, N. Y., is planning for new steel car repair shop, with initial equipment and facilities for annual maintenance of 10,000 cars. Sites are being considered at Lackawanna, N. Y., near shops on Rochester belt line, and in vicinity of Pittsburgh. Plant will cost about \$400,000 with equipment.

Sun Oil Co., Finance Building, Philadelphia, has awarded general contract to A. W. Hopeman & Sons, 569 Lyell Avenue, Rochester, N. Y., for rebuilding part of storage and distributing plant at Syracuse, N. Y., destroyed by fire recently.

Ellicottville Furniture Corporation, Randolph, N. Y., O. S. McLarney, president, will soon take bids on general contract for one-story plant at Ellicottville, to cost about \$45,000 with equipment.

Nicholson Universal Steamship Co., Coe Terminal Building, Detroit, is said to be planning new two-story terminal warehouse and distributing plant at Buffalo, with installation of mechanical handling equipment, estimated to cost \$1,000,000. A. P. Evans is company engineer.

Cunningham-Hall Aircraft Corporation, Rochester, N. Y., has been organized to manufacture airplanes and has leased space in factory of James Cunningham, Son & Co., 13 Canal Street, manufacturer of automobiles. Through arrangement with latter company complete facilities of factory will be available to Aircraft corporation.

## St. Louis

**S**T. LOUIS, Nov. 19.—Plans are being considered by Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis, for one-story addition, 120 x 300 ft., to cost over \$125,000 with equipment.

Blackmore Mfg. Co., 2100 Cass Street, St. Louis, manufacturer of furniture, is planning new factory at De Soto, Mo., to cost about \$40,000 with equipment.

Common Council, McAlester, Okla., is planning establishment of municipal airport, including shops and other units. A fund of \$50,000 is being arranged.

United Power & Light Corporation, Abilene, Kan., is disposing of a bond issue of \$1,000,000, part of proceeds to be used for expansion, including transmission lines, power substations, etc.

Kansas Electric Power Co., Massachusetts Avenue, Lawrence, Kan., is said to be planning a new steam-operated electric power plant near Leavenworth, Kan., to cost more than \$100,000 with equipment.

Universal Car Loading & Distributing Co., Wyoming Street, Kansas City, Kan., is planning new one-story storage and distributing plant, 75 x 225 ft., to cost about \$90,000 with equipment. Latter will include a crane and other mechanical-handling apparatus.

Meginnis & Schaumburg, Federal Trust Building, Lincoln, Neb., architects, have



begun superstructure for a three-story automobile service, repair and garage building, 50 x 140 ft., to cost about \$90,000 with equipment.

Board of Education, Moberly, Mo., is said to be planning installation of manual training department in new two and three-story junior college to cost about \$300,000, for which plans will be drawn by Ludwig Abt, 114 North William Street, architect.

## Pittsburgh

**P**ITTSBURGH, Nov. 19.—In point of inquiry the machine-tool market is active, but the more common experience of dealers is that sales are not in proportion to the requests for bids. The Westinghouse Electric & Mfg. Co. has issued a special list which includes two lathes, a radial and a sensitive drill, a shaper and two milling machines. There is also an inquiry for six tools for the Duquesne works of the Carnegie Steel Co. Tools for a new machine shop for the A. M. Byers Co., at its new plant at Harmony, Pa., will be placed through H. A. Brassert, Chicago, who is the consulting engineer.

O. A. and J. C. L. Brown, Tidiloute, Pa., have organized Penn Cutlery & Tool Co., with capital of \$15,000, and will operate local plant to manufacture cutlery and small tools. Charles F. Maitland, 1500 Fifth Street, N. E., Canton, Ohio, is also interested in new organization.

Parkersburg Corrugated Box Co., Depot Street, Parkersburg, W. Va., has awarded a general contract to Plate Construction Co., Jeannette Street, for one-story mill unit, 50 x 290 ft., to cost about \$100,000 with machinery.

Pittsburgh Foundry & Machine Co., foot of Thirty-sixth Street, Pittsburgh, is having plans drawn for one-story foundry addition, for which bids will soon be asked on general contract. A. M. Tapp, Jenkins Arcade, is architect.

Mott Core Drilling Co., R. & P. Building, Huntington, W. Va., has approved plans for a two-story machine shop, to be used in part for storage and distributing service, to cost about \$26,000 with equipment.

## Cincinnati

**C**INCINNATI, Nov. 19.—Pure Oil Co., York and McLean Streets, Cincinnati, Moore Oil Refining Division, has plans for new storage and distributing plant, to cost more than \$350,000 with tanks and equipment. Present works will be removed to new location.

Board of Public Service, Columbus, Ohio, plans extensions and improvements in municipal electric light and power plant to cost about \$100,000, including installation of boilers, stokers and other equipment. A new turbine unit is contemplated later.

Texas Corporation, Texas Building, Houston, Tex., is said to be planning to rebuild part of oil refinery at Pryse, Ky., recently destroyed by fire.

Continental Lumber & Mfg. Co., Jeffersontown, Ky., M. B. Patton, president, is planning construction of one-story hardwood mill, 100 x 150 ft., for manufacture of automobile and carriage products, to cost more than \$75,000 with machinery. Company will soon purchase boring machine, band saw ripping ma-

chine, cross-cutting tools, cut-off saws, saw tables, and other equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until Nov. 26 for milling cutters, reamers, twist drills, countersinks, etc., circular 182.

Henry Vogt Machine Co., 1002 West Ormsby Avenue, Louisville, manufacturer of ice-making and refrigerating machinery, has awarded general contract to H. A. Doll Construction Co., Lexington Road, for one-story machine shop, to cost \$65,000 with equipment. D. X. Murphy & Brother, Louisville Trust Building, are architects.

Following recent acquisition of Mercury Electric Sign Co., 1717 Magazine Street, Louisville, by Rainbow Light, Inc., Long Island City, N. Y., manufacturer of electric tube luminous lighting units, purchasing company has begun remodeling factory at 432 East Broadway for local branch. Later it is proposed to build entirely new plant unit to cost more than \$200,000.

## Detroit

**D**ETROIT, Nov. 19.—Brown-McLaren Mfg. Co., 5853 West Fort Street, Detroit, manufacturer of screw machine products, adjustable reamers, etc., has purchased six acres at Melvindale, Mich., for new plant, initial unit to be one-story, totaling about 50,000 sq. ft. floor space, to cost over \$100,000 with equipment. Present works will be removed to new location and additional machinery provided for larger output. R. C. Brown is president.

Crane Co., 836 South Michigan Avenue, Chicago, has awarded general contract to Cooper-Little Co., 5057 Woodward Avenue, Detroit, for one-story factory branch and distributing plant at Detroit, with pipe and pipe-fitting department, to cost over \$50,000. H. J. Clarke is company architect.

Cardboard Cutting & Supply Co., 1571 Wellington Street, Detroit, has awarded general contract to Myles Standish, 8100 East Jefferson Street, for an addition to cost about \$40,000 with machinery.

Federal Mogul Corporation, 11031 Shoemaker Avenue, Detroit, manufacturer of metal bearings and kindred products for automotive service, has engaged Pollmar & Ropes, Hoffman Building, architects, to prepare plans for one-story addition, 120 x 175 ft., to cost close to \$70,000 with equipment.

Officials of Central Development Co., Chatham, Ont., headed by R. L. Pattinson and J. V. Howard, operating pipe line properties, have organized Muskegon Pipe Line Co., Muskegon, Mich., to construct a 10-mile pipe line to Muskegon and vicinity for natural gas supply. Line will be extended later. Project will cost more than \$100,000.

Hudson Motor Car Co., 12601 Jefferson Avenue, Detroit, has awarded general contract to Otto Misch Co., 159 East Columbia Street, for two-story addition, 80 x 350 ft., to cost more than \$125,000 with equipment.

Wolverine Screw Products Co., Detroit, has awarded general contract to W. J. C. Kaufmann, 10610 Shoemaker Street, for one-story plant unit to cost over \$35,000 with equipment.

Cadillac Machinery Co., 414 Fisher Building, Detroit, has been appointed agent in Detroit territory for Boye & Emmes Machine Tool Co., Cincinnati.

## Indiana

**I**NDIANAPOLIS, Nov. 19.—Indianapolis Drop Forging Co., 1300 Madison Avenue, Indianapolis, is said to be considering a one-story addition, to cost in excess of \$30,000 with equipment.

Northern Indiana Public Service Co., Hammond, Ind., has plans for new steam-operated electric generating plant at Michigan City, to cost about \$10,000,000 with transmission lines. Holabird & Root, 333 North Michigan Avenue, Chicago, are architects; Sargent & Lundy, 72 West Adams Street, Chicago, are engineers.

Following recent organization of National Equipment Co., Milwaukee, to take over and consolidate Koehring Co. and T. L. Smith Co., both with local plants for manufacture of concrete mixers, gasoline cranes, road machinery, etc., consolidated company has arranged for acquisition of Insley Mfg. Co., 801 North Olney Street, Indianapolis, manufacturer of contractors' machinery and equipment, and Parsons Co., Newton, Iowa, manufacturer of power trench excavators, etc., and will merge with organization, making total assets of about \$9,000,000. Present plants will be continued and expansion is under consideration. Phil A. Koehring is president of new company.

North American Car Corporation, North Judson, Ind., manufacturer of tank cars, etc., plans rebuilding of local plant destroyed by fire Nov. 12. Headquarters are at 327 South La Salle Street, Chicago.

Board of Waterworks, City Hall, Evansville, will receive bids until Nov. 26 for two steel tanks, each 100,000-gal. capacity, on steel towers.

Tri-State Engineering Co., Zanesville, Ohio, has removed shop to Fort Wayne, Ind., and changed name to Woodard Engineering Co.

## Pacific Coast

**S**AN FRANCISCO, Nov. 15.—Contract has been let by Neilson Steel Aircraft Corporation, Second and Camella Streets, Berkeley, Cal., to A. Kirby, 2315 Twenty-fourth Avenue, for first unit of new airplane manufacturing plant on 3-acre tract, to cost about \$35,000 with equipment. Other units will be built later, entire project to cost more than \$100,000. Thomas S. Neilson is head.

Board of Education, Pomona, Cal., has approved plans for one-story vocational shop, 50 x 160 ft., at new high school group, to cost \$300,000, for which bids are being asked on general contract until Dec. 11. T. C. Kistner & Co., Architects Building, Los Angeles, are architects.

Buttress Mfg. Co., 507 Shatto Place, Los Angeles, manufacturer of wallboard, has filed plans for two-story plant 117 x 165 ft., to cost about \$70,000 with equipment. Moran Co., 740 South Broadway, is architect.

William Harris and Frank J. Solt, San Bernardino, Cal., have organized company to manufacture airplanes, and have awarded contract for initial unit, 80 x 200 ft., to cost about \$40,000 with equipment. It will be used for parts and assembling. J. Paxton Perrine, Lincoln Building, Los Angeles, is architect.

Shell Oil Co., 200 Bush Street, San Francisco, is considering new storage and distributing plant at Oakland, Cal., to cost about \$300,000 with equipment. Engi-

neering department of company is in charge.

City Council, Santa Monica, Cal., has plans for municipal airport at Clover Field, including shops and other units, to cost about \$50,000 with equipment. City engineer is in charge.

Washington Pulp & Paper Corporation, Port Angeles, Wash., is planning construction of new one-story chipping mill for pulp wood supply and power plant at Neah Bay, to cost over \$85,000 with equipment.

Coast Union High School District, San Luis Obispo, Cal., has approved plans for one-story manual arts building at high school at Cambria. Symmes & Cullimore, Bakersfield, Cal., are architects.

Racor-Pacific Frog & Switch Co., recently organized with capital of \$1,000,000 by officials of Ramapo-Ajax Corporation, Hillburn, N. Y., as a subsidiary, has awarded general contract to Austin Co., at Seattle, for new plant at last noted city, to manufacture railroad frogs and switches, for Pacific Coast trade, to cost about \$250,000 with equipment.

## Canada

**T**ORONTO, Nov. 19—Although machine tool sales fell off slightly the past week, inquiries carried over from the first of this month and those now appearing indicate that November business will not fall much below the earlier months this year. Sales were confined to units of one or two, but several lists have recently appeared for a half-dozen tools. Dealers and builders look for a continuation of demand for tools for some time and indications are that this year will set a new high record for peace years.

Riley Engineering & Supply Co., 360 Dufferin Street, Toronto, manufacturer of condensers, coal pulverizers, oil filters, etc., will start work soon on a manufacturing plant and office building to cost \$75,000, in Fairbank District, York Township, Ont.

Hull Implement Co., formerly Mississippi Iron Works, Almonte, Ont., has purchased a site at Hull, Que., for erection of a plant. New tools and machinery will be required.

Former plant of Maritime Bridge Co., Ltd., New Glasgow, N. S., which ceased operations in 1917 after being partially destroyed by fire, has been purchased from liquidator by W. A. McNeill, one of original owners of property. New machinery and equipment will be required.

Grinnell Co. of Canada, Ltd., 2440 Dundas Street, West, Toronto, has acquired control of Ontario Malleable Iron Co., Ltd., Oshawa, Ont., for approximately \$1,000,000. The two plants will be operated separately, and Ontario Malleable company will retain its name. No extensions are contemplated at present. Russell Grinnell will be president of re-organized companies; C. G. Sherman, vice-president; L. W. Jones, treasurer, and E. W. Shaw secretary. Directors include W. L. Horn, F. W. Cowan and John Dyer.

Canadian Cannery Co., St. Isidore de Laprairie, Que., will call for tenders in December for erection of plant at St. Hyacinthe, Que., to cost \$100,000.

Regent Knitting Mills, Ltd., 4060 St. Lawrence Boulevard, Montreal, is considering construction of a power plant on

North River at St. Jerome, Que., to cost \$65,000.

Stuart Construction Co., Art Building, Sherbrooke, Que., has been awarded contract for one-story factory, 100 x 200 ft., for Bates Valve & Bag Co., Ltd., Cap de la Madeleine, Que., to cost \$50,000.

Exide Batteries of Canada, Ltd., 153 Dufferin Street, Toronto, will start work soon on erection of an addition to cost \$27,500.

### Western Canada

Dominion Department of Public Works, Ottawa, Ont., has retained C. D. Howe & Co., engineers, Port Arthur, Ont., to prepare plans for a 1,000,000 bu. grain elevator at Fort Churchill, Man.

Winnipeg Electric Co., Winnipeg, will soon call for bids for construction of a \$250,000 power house, to be built on completion of railroad from Whitemouth, Man. This is part of \$15,000,000 power development at Seven Sisters Falls, Man.

## Foreign

**A** COMPANY at Sao Paulo, Brazil, is completing plans for early construction of nitrogen fixation plant requiring large investment for machinery, and has awarded general contract to a local company. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Brazil No. 200891.

Itabira Iron Ore Co., Ltd., Rio de Janeiro, Brazil, has secured approval of Brazilian Government of contract and concession obtained from State of Minas Geraes, covering development of iron ore and manganese properties. Plans are under way for erection of plant, with distributing facilities for raw product.

State Railways, Bangkok, Siam, will receive bids until Jan. 15 for 300 low-side steel wagons, as per specifications on file.

## New Trade Publications

**Overhead Conveyors.**—Cleveland Electric Tramrail, Wickliffe, Ohio. Four-page folder TR-602 is concerned with the ease of pushing heavy loads suspended from an overhead tramrail accurately lined up.

**Steam Boilers.**—Erie City Iron Works, Erie, Pa. Two booklets describing and illustrating respectively return tubular boilers and the "economic" boiler. Both are horizontal units set in brick or similar casings and fired externally. They may be used with stokers, pulverized coal or oil fuels. Dimensions for the different sizes are given in tabular form. Each pamphlet is of 16 pages.

**Oil Engines.**—Walter A. Zelnicker Supply Co., St. Louis. Bulletin 373 listing used and rebuilt oil engines now offered by company. List includes marine Diesel engines, oil engine generators and other miscellaneous products.

**Meters.**—Connersville Blower Co., Connersville, Ind. Bulletin 4D dealing with company's different types of meters. Various features are described in detail with illustrations and charts, and sections are devoted to P. V. T. T. recorders, tandem meters for measurement over wide range of capacity and demand meters recording maximum consumption at hourly or half-hourly intervals.

Henry Ford and associated interests in Ford Motor Co., Detroit, have organized a new European subsidiary to be known as Ford Motor Co., Ltd., capitalized at £7,000,000 (about \$32,800,000), with headquarters in London. New company will take over all Ford interests in Europe, including plants and distributing branches. Work will proceed on main plant at Dagenham, England, where site was secured several months ago. Property has been purchased on Regent Street, London, for display and distributing center, with service and repair facilities and executive offices. Company will expand branch factory at Cork, Ireland, for production of Fordson tractors. Plant at Manchester will be extended. Sir Percival Perry, who introduced first Ford car in England, will be chairman of board of new company.

Plans are under way for a consolidation of Dorman Long & Co., Ltd., known as Clarence Iron & Steel Works, Port Clarence, Durham England, capitalized at \$60,000,000, specializing in production of steel ship plates and kindred iron and steel products, and Bolckow, Vaughn & Co., Ltd., operating Grangetown Iron Works, Bessemer Iron Works and Clay Lane Iron Works, at South Bank, York, and Middlesbrough Iron Works, Middlesbrough, with capital of \$40,000,000. New company will consolidate certain plants and plans expansion in output.

Soviet Radio Trust of Soviet Russian Government, Petrograd, has awarded contract to Radio Corporation of America, Woolworth Building, New York, for radio equipment and apparatus to an amount of 1,200,000 rubles (about \$600,000). Broadcasting and receiving stations will be built at different points in Russia, and accessory apparatus, including power equipment, acquired. Amtorg Trading Corporation, 165 Broadway, New York, is official buying agency for Soviet Government.

**Handling Equipment.**—Steubing Cowan Co., Cincinnati. Pamphlet devoted to use of lift truck platform systems by railroad and other carriers. Numerous illustrations are provided to show handling of materials in storehouse and machine shops. Emphasis is placed on economies to be achieved by consolidating less-than-carload shipments of freight on skid platforms.

**Centrifugal Pumps.**—Dayton-Dowd Co., Quincy, Ill. Bulletin 267 describing types CS and CSLH double-suction, single-stage centrifugal pumps. Type CS is designed for medium and high head service, type CSLH for low head service, and large capacity pumps, also dealt with, are provided for use in water works, filtration plants and drainage and irrigation projects.

**Concrete Products.**—Celite Products Co., Los Angeles, Bulletin 340, illustrated, dealing with methods by which relative degree of workability of concrete mixes can be measured. Effects of workability on strength, uniformity, water resistance and appearance of finished concrete are also discussed.

**Electric Motors.**—Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis. Bulletin 157 describing large RA single-phase repulsion-induction motors. Complete construction details are provided by means of illustrations, charts and text.